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ON THE ALKALOIDS OF HYDRASTIS CANADENSIS.

By Wm. S. Merrill, A. M.

To the Editor of the American Journal of Pharmacy.

I hoped to be able to attend the approaching meeting of the American Pharmaceutical Association, but find I shall not be able to leave home. I have therefore forwarded to you a small package of samples, chiefly products obtained from the Hydrastis, and request you will present them to the Association for their examination.

In a business letter to Prof. Parrish, some months ago, I briefly mentioned these. I was not publishing an analysis or writing an essay, but briefly stated the fuller results of our experiments, of which I had previously sent him some samples; and I expressed a willingness to have these statements published, as they contained some facts that I did not suppose had been previously announced. Under these circumstances, I certainly thought some portion of your criticism of the article quite uncalled for.

Our examination of the hydrastis was principally made last fall, and I then knew nothing of the analysis of Durand, further than stated in U. S. D., which concludes by saying, "He also discovered a peculiar nitrogenous crystallizable substance for which he proposes the provisional name 'Hydrastin,' until it shall be determined whether it be, as he suspects, an organic alkali." This is certainly very indefinite, and does not even make it certain which of the two alkaloid bases it was which he discovered.

On the 6th of Feb. last, when sending to Prof. Parrish some samples of xanthoxylum bark and other articles for the cabinet which the Pharmaciens of Philadelphia were getting up for ex-

hibition at the World's Fair, I enclosed with them specimens of *Hydrastina* and *Mur. Hydrastia,* which we had obtained, and briefly mentioned their leading properties. These were placed in the College cabinet, and there, Mr. Editor, you had seen them so labelled, and refer to them in your note to the article of Dr. Mahla in the Journal of that month. You certainly must have forgotten this, when in your criticism of July, speaking of my report that "the Hydrastis contains *two* distinct alkaloids, which we name Hydrastia and Hydrastina," you say "this assumption is to be discountenanced," because I did not acknowledge the analysis of Durand, and Mahla and Perrins, as previous discoveries. Mr. Durand had discovered but of one these bases, and that hypothetically, and Dr. Mahla's article, which had not then appeared, speaks of but one. The articles of J. Dyson Perrins indeed recognises two, but these were not published in London until the April and May following, and I had seen nothing of them until their appearance in the same number of your Journal with the extract of my letter to Prof. Parrish.

It is evident in regard to all of us that our investigations were entirely independent of the others, and thus far *original*, whichever may be entitled to credit in point of time.

I certainly have no wish to arrogate to myself the merits of other men's skill or discoveries, although I may be remiss in keeping myself posted in regard to them. And lest I be again accused of any such injustice, I beg leave here to state, I have not conducted these recent experiments alone. Fifteen years ago I first introduced to the medical profession, the Podophyllin, Macrotin, Leptandrin, and some others of that class of agents known as the "Resinoids" or "Concentrated remedies," and set the ball rolling in that direction. But the extensive mercantile and manufacturing business in which, in company with my brother, I became engaged, has since so engrossed my attention that I have found no time for the careful labors of chemical investigation and analysis. We have long felt, however, that many of that class of agents must be greatly improved and perfected by accurate and scientific analysis, or else be rejected from the list of medicinal agents, and have fully appreciated the wide field opened in vegetable materia medica, which, whatever may be our ability, we had no time to cultivate. We have,

therefore, employed as an assistant in our laboratory, Prof. H. D. Garrison, a chemist of no mean acquirements, and while he works under our direction, and a good portion of the particular experiments and the steps pursued are at my suggestion, the *manipulations* are almost all performed and the results obtained by him.*

*Note by the Editor.—It seems needful to again refer to the subject of Mr. Merrill's paper, in order that we shall be fairly understood, both by the author and reader. The question at issue relates to the discovery of the active principles of the root of Hydrastis canadensis. In our July number, we published an extract of a letter to Mr. Parrish with the authority of the writer, Mr. Merrill, and accompanied the paper with a critical note. In that paper Mr. Merrill spoke of the two alkaloids in the hydrastis, as though he had discovered them, and applies names to them as though they had not been written of before, he giving the commercial hydrastin the name of Durand's alkaloid, hydrastia; and calling the latter hydrastina; and it was to what we believed to be a disposition to ignore the labors of others that we applied the terms "this assumption is to be discountenanced." Mr. Merrill's explanations tend to modify this belief,

In the present paper, Mr. Merrill says, "It is evident in regard to all of us that our investigations were entirely independent of the others, whichever may be entitled to credit in point of time." "I certainly have no wish to arrogate to myself the merits of other men's skill or discoveries, although I may be remiss in keeping myself posted in regard to them."

Now we will not grant the position, that Mr. Merrill discovered either of the alkaloids, much less both of them, in the proper sense of making a discovery; nor can we admit Mr. Merrill's alleged ignorance of the details of Durand's paper, as an argument in his favor, in view of his knowledge of its existence near at hand, as he himself admits. In 1856, when sending out a collection of the American Materia Medica to Mr. Jacob Bell, for the Museum of the Pharmaceutical Society, we wrote to Mr. Wayne, of Cincinnati, for certain specimens not easily obtainable here. In his reply to my letter, Mr. Wayne, under date Cincinnati, May 23d, 1856, says, ... "I have sent you among the lot specimens sanguinarina, sulphate of sanguinarina, *hydrastin*, and *hydrastia?* I think the last *has all claims to be called an alkaloid.* The specimen is as white as it can be made, *much more so than your pet specimen*, [alluding to a specimen of Durand's hydrastia in our cabinet, presented to us in 1851, and which we had shown to him on a previous occasion]. I have a new process for obtaining *hydrastin*, at least I have seen no mention of it. I treat the coarse powdered root with cold water in a percolator. To the infusion I add an acid, generally muriatic acid, which throws down the hydrastin as a yel-

In commencing our investigations, therefore, one of the first articles we took up was the hydrastis; and we thought we had acquired a pretty accurate knowledge of its constitution, and had

low powder, along with a pectin-like substance. . . . If the precipitate be now treated with boiling alcohol, only the hydrastin is taken up and crystallizes out upon cooling. By this process much less alcohol is lost than in the process of the Eclectic Disp. [Hill's process] and a much finer looking product obtained."

In regard to hydrastia, Mr. Wayne further says: "After I obtain the *hydrastin* from the cold infusion by an acid, I add to the acid liquor an alkali which precipitates a pale yellow powder, which being dried and treated with ether or alcohol, the hydrastia is taken up, and, upon evaporation, it is deposited in colored crystals, which by repeated solution and crystallization are obtained colorless."

Dr. John King, in the Eclectic Dispensatory, says, page 489—edit. 1859—in speaking of hydrastin (muriate of berberina:) "This elegant and highly valuable article was introduced to the profession by Dr. H. H. Hill, of the firm of F. D. Hill & Co., wholesale druggists in Cincinnati," and the process adopted by that gentleman is given in detail at page 480. By reference to the *advertising* sheet of the Eclectic Medical Journal for January, 1853, page 4, we find the following note attached to the name 'hydrastin' in a list of preparations advertised by F. D. Hill & Co., of Cincinnati, viz. This article, introduced by us one year ago, is one of the finest extant amongst Botanic medicines. In fact it is the quinine of North America." Hence Mr. Hill did not produce his Hydrastin until a year after Durand wrote, because Durand's Thesis was written in the summer of 1850—presented to the College at the session '50—'51, and of course not published till after the spring commencement in the latter year. Mr. Wayne's process is also given in that work, and nothing is said in reference to Mr. Merrill in that connection, albeit he was largely consulted by Dr. King in the compilation of his work. Our own impression had been that Durand's hydrastia was the only alkaloid in the hydrastis, and that the *hydrastin* of the Eclectic Dispensatory was the alkaloid of Durand, disguised by the yellow coloring matter of that author, [since shown to be berberina by Dr. Mahla], and the reader will find in the Pharmaceutical Journal, vol. 16th, November, 1856, page 269, the following note that accompanied the sample of Eclectic hydrastin then sent to London: "*Hydrastin.* A small specimen of this principle, which is used by the Eclectics as a remedy, &c. &c. I believe the yellow color is mainly due to adherent yellow resin or coloring matter, just as piperine is colored by the resin of pepper;" previous reference had been made to Durand's discovery of the alkaloid on the same page. From this it will be seen that at that time neither Mr. Wayne nor ourself had a correct notion of the nature of hy-

briefly reported the result, when Prof. Parrish, in his letter of March 8th, acknowledging the receipt of the specimens, says: "The Hydrastina, and Muriate of 'Hydrastia', (Berberina,) and the salt of Sanguinarina are very acceptable, and are placed in the College cabinet, and adds, 'I suppose you have seen the late analysis of a Chicago chemist, transferred to the American Journal of Pharmacy for the current month. This whole subject of the proximate principles of the hydrastis requires further ventilation."

In fact, however, I had not seen the article of Dr. Mahla referred to, and the above word in parenthesis was the first inti-

drastin. Subsequently to this—August, 1857—Mr. H. A. Tilden, of New Lebanon, sent us some samples of vegetable principles, and among them two labelled as follows: "Hydrastin," in silky crystals, and "Hydrastina alkaloid," a yellow amorphous powder. At that time we supposed it also was Durand's alkaloid, with yellow coloring matter, in a pulverized condition, but now, on trial, it is soluble in water to a considerable extent, coloring it yellow, and the solution restores the color of reddened litmus, and it is probably berberina.

Mr. Merrill's allusion to the specimens sent to Mr. Parrish, therefore, have nothing to do in deciding the case, as pure specimens of the same had been in our private cabinet for five years previously, as will be seen above.

It will be observed that Mr. Merrill recedes from his position in his former paper, that hydrastin is not berberina, he having been misled by the impurity of his sample of berberina.

We also wish to remark on Mr. Merrill's views in regard to the naming of those principles. He calls Durand's alkaloid Hydrastina, and the berberina alkaloid Hydrastia. We protest against this suggestion. Durand distinctly claims for his alkaloid (see page 117, vol. 23d, of the Amer. Journ. Pharm.,) if his assertion of its alkaline nature is corroborated, the name of *hydrastia*. Now, as *it* is the only peculiar alkaloid in hydrastis, it is entitled to that name, 1st, because it was given to it by Durand in 1851, and 2d, because it is the proper derivative for an alkaloid from the name hydrastis. Mr. Merrill argues that because berberina is more abundant in the hydrastis than in other sources, it should be called hydrastia. This will not do, because berberina is found in at least four distinct drugs, and Columbo has equal claims. He also suggests "Xanthia" from its color. This is a beautiful name, and might have been appropriately used at first, but it is not probable that this name will be adopted, as M. Buchner, Sr. and Son, in 1835, described this alkaloid in great detail, and gave it its present name, (see Journ. de Pharm., vol. xxi. page 408.)

Lastly, in justice to Mr. Durand, we wish to remove the impression con-

mation I had that the alkaloid I had named Hydrastia, was identical with berberina. The analysis of Mahla was not entirely satisfactory, and I immediately set about having this point further investigated.

From some brief experiments, too crude to be reported as a scientific analysis, I had a long time before satisfied myself that the yellow coloring principle of the xanthorhiza was the same as that of the berberis, but did not suspect their identity with that of the hydrastis.

To determine this question, we prepared crystallized specimens of the muriate of berberina, and of our hydrastia, and subjected them to a series of comparative experiments, and these *then* led us to the conclusion, that although similar, they were not identical. Among these experiments were the following:

1st. Equal quantities of these muriates were dissolved in a dilute solution of potassa. That of hydrastia remained unchanged in color, whilst that of berberina became hyacinth red, and these colors remained at the end of five days.

2d. Equal portions were dissolved in equal quantities of boiling alcohol. On cooling, the muriate of hydrastia soon formed large stellar crystals, and when cold became semi-solid. The berberina solution when cold, showed only a cloud of extremely fine crystals. And as far as tried, this salt of berberina appeared more soluble in all cold menstrua, than that of the hydrastia.

3. To equal solutions in alcohol, tincture of iodine was added. In

veyed in the paper of Mr. Merrill, that Durand's description of his alkaloid was very indefinite. So far from this being the case, he describes three distinct processes for obtaining it, proves its alkaline reaction, its crystalline form, its saturating power, its precipitability by tannic acid and ammonia, its total destructibility by heat, and its nitrogenous nature. The only reason he hesitated to call it an alkaloid was the fact of its salts not crystallizing. Now on this point Mr. Merrill says it forms salts, "that are very soluble, and difficultly, if at all, crystallizable," and hence he corroborates Durand, and removes the only reason why he hesitated to call his product *hydrastia*. With these explanations of the past history of these principles, we are prepared to accord to Mr. Merrill and Prof. Garrison all credit due them for their investigations of these principles in the pages which follow, as a valuable contribution to the knowledge of the subject.

the hydrastia solution, large crystals soon appeared, and continued to form until the whole was a solid mass. Those under the microscope appear long, slender, and bright yellow. The berberina solution slowly evolved fine crystals, much less copiously, and these under the micoscope have a *brownish* hue.

The behaviour with iodide of potassium was much the same, and the distinctions similar.

4. Equal solutions were treated with neutral acetate of lead. Both gave copious yellow precipitates, but that of the berberina appeared perfectly amorphous under the microscope (of 150 diam.) while that of the hydrastia was resolved into a mass of silky crystals.

Several other similar tests were applied, some of which showed no appreciable difference between the two salts, while in others differences were discovered that tended to confirm the conclusions drawn from the above, and named in our letter of June, viz., that the two bases were not identical. We did not resort to ultimate analysis, for want of suitable apparatus.

We have not been able to repeat or extend these experiments for want of suitable material from which to prepare a better specimen of berberina. But we have since prepared the muriate of the alkaloid base of the xanthorhiza, of which we send you a sample labelled, "mur. *xanthia*," and this we have satisfied ourselves is identical with that of the hydrastia, and this fact, together with the analyses of Mahla and Perrins, leads us to believe our experiments above stated to be delusive, in consequence of some imperfection in our preparation of the berberina, of which we had but a small quantity. Hence we admit the conclusion of Mr. Perrins, that the yellow coloring principle of the hydrastis, the berberis, and the xanthorhiza, are in all probability identical.

What then is the appropriate name of this beautiful alkaloid? The hydrastis is by far its most copious source, and that from which it will, no doubt, be chiefly obtained; and on this account should have the preference in giving it its name. Moreover, its salts will, without doubt, become important agents in the materia medica, and it is very desirable on this account that its name should point to the plant from which it is derived. These I think strong arguments, especially the latter, in favor of the

name "Hydrastia," which I proposed for it. On the other hand, the other alkaloid, which as yet is known to be found in this plant only, must naturally receive its name from it, and the similarity between the names hydrastia and hydrastina may lead to confusion and mistakes. It may also be considered partial to derive from one plant the name for a principle that is found in several. If these objections should be considered paramount, then I suggest for it the name *xanthia*, from the Greek xanthos, —yellow,—a most appropriate name, as it is the only alkaloid known of a bright yellow color.

But although this article is already sufficiently extended, I have not yet reported the processes by which we have obtained these preparations. These are in general indicated in the essays of Mahla and Perrins. But without going over the various experiments we have tried, and the possible processes that may be pursued, I will briefly state those which we have found most simple and eligible.

1st. The ground root may be exhausted, (and this is best done by percolation,) either by alcohol, dilute spirit, or even water.

If it is desired to obtain and preserve the dark resinoid principle which is abundant in the root, and is not without some medicinal value, then alcohol of ordinary strength must be used, adding water at the last to drive out the spirit that it may be recovered. The alcohol must then be distilled off, and the resinoid, (which should be named hydrastin,) be allowed to settle, and be removed and dried.

2d. To the clear solution, whether obtained by alcohol or water, add hydrochloric acid, as long as a precipitate is formed, or until the liquid is distinctly sour.

This combines with both bases, but the muriate of hydrastia (or xanthia) being sparingly soluble in water, or cold alcohol is precipitated as a bright yellow powder, and is collected and washed on a filter. A precipitate may be obtained by other acids, and by many salts, especially the muriates, but the most satisfactory results are by free muriatic acid. The impure muriate thus obtained is purified by dissolving it in hot alcohol, and treating it with animal charcoal, as described by others. The clear solution on cooling crystallizes in beautiful acicular yellow crystals.

From this all the other salts are readily obtained by processes that will suggest themselves to every chemist. They mostly crystallize in needle-shaped or feathery crystals, and are all of a brilliant yellow color.

A little of the pure base *hydrastia* was obtained by withdrawing the acid from the sulphate by baryta, or what succeeded better in our hands, by oxide of lead. The pure alkaloid is uncrystallizable, but combines readily with all acids which we have presented to it.

The other alkaloid which we had named "hydrastina," is still in the mother liquor. From this it is precipitated in its basic condition by an alkali, say soda or ammonia, which combines with its organic acid, or the hydrochloric acid with which it is now combined, and let it fall as a greyish white powder, as it is wholly insoluble in cold aqueous fluids. This is purified by repeated solution in boiling alcohol, and crystallization from it on cooling. It crystallizes in large, quadrangular prisms, with very acute pyramidal summits, and when pure are white or colorless. Although itself is quite insoluble in water, and is easily crystallized, it readily combines with all the acids, and forms salts that are very soluble, and difficultly, if at all, crystallizable: presenting in these respects exactly the reverse of the other alkaloid.

When the preservation of the resinoid principle is not desired, these alkaloids may be more economically obtained by exhausting the ground root with dilute sulphuric acid, instead of alcohol, as the sulphates of both of them are readily soluble, but the process is somewhat more circuitous and complicated, and I will not extend this already too long paper to describe it.

We have isolated the organic acid with which these bases are combined in their normal state, but not in sufficient quantity or purity to enable us to determine whether it be a distinct principle, or is identical with some of the vegetable acids already known. If time permits, we will investigate that matter farther.

Submitting these remarks, I remain, yours truly,

WM. S. MERRILL, A. M.

Cincinnati, August 25th, 1862.

ON THE CULTURE OF THE ELATERIUM PLANT.

By Robert P. Thomas, M. D.

(From the Proceedings of the American Pharmaceutical Association.)

Can Elaterium be produced in the United States? and if so, is the indigenous product equal in power to the English drug? A satisfactory determination of this question can only be made by a person having convenient access to a rural district, and sufficient leisure to watch the ripening of the fruits, and to collect them at the proper moment. Having been unable to give personal attention to the growth of the plants, the writer made an arrangement with a relative in Germantown to undertake their culture, and procured an ounce of the seeds from England for the experiment. Small as this quantity seems, it would probably have answered the purpose had we been possessed of sufficient practical knowledge of the proper time for planting.

In August, 1850, I plucked a single fruit from a vigorous plant in Dr. Wood's garden, and kept its seeds until the following May, when they were planted in garden soil in a warm situation. Vigorous plants sprang from these seeds, and furnished well-matured fruits in the latter part of August and the early part of September. Most of the fruits were collected for class exhibition. A few, however, dropped on the ground, and in the following year a larger crop appeared spontaneously,—thus showing that the seeds will survive our winter months. Misled by this observation as to the hardiness of the seeds, I made the mistake of having those from England planted on the 25th of April, last year. This period proved premature, as not a single plant appeared. Cold, wet weather followed, and the seeds rotted in the ground. A few, that had been left, were planted on the first of June. These produced plants, more or less vigorous, according to position and exposure. For instance, those upon high ground, and in situations exposed to the sun, were strong and vigorous; while others, upon a shady hill-side, were dwarfed and stunted. The fruits of the former were large and perfect, while the latter remained small and

green. The quantity obtained was too little for any attempt at the preparation of Elaterium.

Arrangements were made for renewing the experiments the present year, but absence from home with the Army of the Potomac, at the proper period for planting, interfered with the design, and, as a consequence, I am unable to answer the question referred to me by the Association.

Something, however, in the way of experience has been gained, which will prove useful to other observers, more favorably situated, in the prosecution of the inquiry. In England, according to the late Mr. Jacob Bell, the seeds are sown in March, and the seedlings planted in June. My best results were obtained by placing the seeds in pots towards the last of April, and setting out the plants in rich warm soil in the latter part of May, or beginning of June. When thus managed, the Momordica Elaterium thrives vigorously in our climate, and I do not entertain a doubt as to its yielding a large amount of active principle.

Philadelphia, August, 1862.

ON THE RESINOID MATTER OF COLOCYNTH.

By John Faber.

(From the Proceedings of the American Pharmaceutical Association.)

Has the resinoid principle of Colocynth, extracted by alcohol, a reliable and constant therapeutic power, and may it be advantageously employed in medicine?

2½ lbs. Colocynth were deprived of the seeds and the pulp, weighing 10 ounces, treated with 90 per cent. alcohol, the result being a resinous product, weighing 1½ ounce. Follows specimen.

As the medicinal action could only be investigated by the physician, I distributed it among my acquaintances, put up for their convenience in ¼, ½ and 1 grain pills, but failed to get a report, the majority of them being afraid of the violent action, while some of them that had sufficient interest in the

matter, and had the opportunity to try it in one of our public institutions, were prevented from doing so by assuming patriotic duties.

While I beg to have the subject continued to me for another year, I shall mention that the Prussian Dispensatory has an alcoholic extract of Colocynth made with an alcohol of 0·895 sp. gr., the effect of which is described as: Vis, vehementissime laxans. It acts sufficiently in ¼ grain doses, and in ½, 1 grain doses, most powerfully purging and vomiting.

The yield of this extract was 3½ ounces from 10 ounces of pulp, containing besides resin a good proportion of extractive matter.

From my own personal experience in dispensing this alcoholic extract, I am enabled to say that its effectiveness is not impaired by time or age. Follows specimen.

New York, August, 1862.

GLEANINGS FROM THE FRENCH JOURNALS.

By the Editor.

Chemical Characters of Bile.—M. Noel, of Rheims, has analysed some bile furnished by a biliary fistula, with the following results:

Water	98·764
Cholesterine	0·021
Carbonate of soda	0·110
Chloride of sodium	0·600
Chloride of ammonium	0·016
Sulphate and phosphate of lime	0·015
Phosphate of soda, soda salts of fatty acids and of cholic and choleic acids, of Strecker; Coloring matter	0.474
	100,000

Various reagents have been recommended for detecting smaller quantities of bile in the liquids of the animal economy. M. Pettenkoffer has advised the employment of a mixture of

sugar and sulphuric acid; this reagent has proved very uncertain. The author has obtained much more satisfactory results with pure nitric acid, and more certainly than with nitroso-nitric acid which is indicated; the application is very simple. A fragment of Berzelius paper is dipped for a few moments in the liquid to be examined, and then dried in the air. It is then touched with a rod dipped in pure nitric acid, when the presence of bile is indicated by the production of a violet color, which passes to red and afterwards to yellow.—*Journ. de Chim. Méd.*

Saccharine Secretion of the Flowers of the Crown Imperial.—The nectaries of this plant secrete colorless transparent drops of a liquid, sweet to the taste, and free from odor, bitterness or acrimony. The liquid is composed of water, sugar of grapes, uncrystallizable sugar, and a little mucilage, without any of the astringency or acrimony of the plant itself.—*Journ de Chim. Méd.*

Purification of sulphate of copper from Iron.—Agitate a solution of the impure salt with recently precipitated subcarbonate of copper. On allowing the liquid to rest, all the iron will be separated as a carbonate and the filtered solution contains no trace of iron.—*Journ. de Chim. Méd.*

On Spoiled Wine.—M. Nickles, in a paper published in *Journal de Pharmacie*, August, 1862, asserts that spoiled or altered wine contains propionic acid, and a larger proportion of potassa than good wine, and that this is due to the fermentation of a portion of the tartaric acid of the tartar, during which a certain portion of the tartar of the wine cask disappears, producing propionic acid.

Gallic acid in red Wine.—M. Simmler, Jour. de Pharm., Aout. 1862, having suspected the presence of gallic acid in this wine, tried the red wine of the Grisons, by removing its tannin with isinglass, and then applying sesquichloride of iron, and obtained a greenish-brown coloration, becoming violet-black by by exposure to the air.—*Journ. de Pharm.*

On a mode of distinguishing Tartaric and Citric Acids.—Digest the suspected acid with hydrated sesquioxide of iron in a

test-tube; afterwards carry it slowly to ebullition, allow the excess of oxide to deposit, and decant the clear supernatant liquid. Evaporate this solution to a syrupy consistence; if the acid is citric, the liquid is limpid and of a beautiful red; if, to to the contrary, there is tartaric acid present, the liquid becomes cloudy and deposits a pulverulent combination of tartaric acid and sesquioxide of iron.

This reaction is sensible in detecting 1 per cent. of tartaric acid.—*Zeitschrift fur Chem. und Pharm. and Journ. de Pharm.*

Beet-root Salts, and their use in Saltpetre manufacture.—M. H. Schwartz (Polytech. Centralblatt) says that the *vinasse* or liquid left in the still when fermented beet-juice is distilled for alcohol, when evaporated to dryness, calcined to remove organic matter, and lixiviated, yields, to water, the following salts: carbonate of potassa, carbonate of soda, chloride of potassium, sulphate of potassa, and small quantities of ferrocyanurets, formiates, and sulphocyanurets. By the evaporation of this solution the sulphate of potassa precipitates first, and the chloride of potassium crystallizes during the cooling of the liquor, accompanied by the larger portion of the ferrocyanuret. The mother water evaporated to dryness produces a grey mass, which by expression becomes red, from the oxidation of iron present. By lixiviation and filtration, the carbonated alkaline salts are obtained white by evaporation. This impure carbonate of potassa may be employed in the preparation of saltpetre by double decomposition with nitrate of soda and crystallization. —*Journ. de Chem. Méd.*

Action of water on the mineral salts of vegetable substances.—M. A. Terreil, in a note to the Academy of Sciences, says that the phosphate of lime and magnesia exist in plants in a peculiar condition, that they are soluble in water through the agency of organic matter, and can then be moved easily in the circulation of the vegetable and deposited in the parts where they are required in its development.

From this fact the author infers

1st. That the products of macerating, infusing and decocting medicinal plants, owe perhaps a part of their action on the economy to the phosphoric acid and phosphates that they contain.

2d. That the phosphate of lime of bone, also that of magnesia contained in the urine of animals can only come from the phosphates that vegetables contain in a soluble state which circulate in the economy through the agency of liquids absorbed by the organs of nutrition.

3d. That the absorption of insoluble phosphates by plants is effected by aid of organic matter contained in the soil, and which render said salts for the time soluble in water.—*Journ. de Chem. Méd.*

Analysis of chocolate. M. Alfred Mitscherlich has found in 100 partsof Guyaquil cacao, 45 to 49 per cent. of butter; 14 to 18 of starch: 0·34 glucose; 0·26 cane sugar; 5·8 cellulose; 3·5 to 5 coloring matter; 13 to 18 albuminoid matter; 1·2 to 1.5 theobromine; 3·5 ashes; 5·6 to 6·3 water. *The proportion of starch is very considerable;* it is a fact not to be overlooked by experts who find chocolate mixed with feculent substances. The coloring matter appears to be an altered product, because the fresh seeds are white. Theobromine is found in the shells of the cacao which contain one per cent. of their weight.

Labels to aid the Pharmaceutical Student.—M. Barbot, of Saintes (*Jour. de Chim. Méd.*), suggests the idea of throwing together in the form of a square label a succinct account of the preparation contained in each bottle so that the apprentice can always be put on his guard and have an instantaneous reference on every occasion of handling a bottle. The following is a sample:—

SCAMMONY. A gum resinous concrete juice yielded by *Convolvulus scammonia.*
FAMILY, Convolvulaceæ.
SOURCE, Aleppo.
Substance POISONOUS in large doses.
PROPERTIES, Purgative, Drastic.
To be SOLD only on PRESCRIPTION.
USE, internally, in the dose of 2½ to 15 grs. in pills, bolus, and emulsion.
COST per lb..... SOLD at ....1 dr. 1 oz. 4 oz. lb.
No. ....

On the presence of Nicotina in human viscera. M. Morin, of Rouen, examined the lungs and liver of a man sixty-six years old, who continued the use of tobacco till his death. The lungs and liver were each treated with acidulated water, after being cut in little pieces, for several days, filtered through paper free from carbonate of lime, and concentrated to one-third of its volume, filter—add excess of alcohol, filter—regain the alcohol—add excess of caustic potassa, agitate with ether—decant the ether and evaporate, when an acid residue possessing the odor and taste of nicotine was obtained which comported itself with tests so as to be identified with that alkaloid.—*Jour. de Chim. Méd.*

Fumigating cones or pastilles. Dr. Felix Roubaud has published Dr. Corbel-Lagneau's formula for these preparations used in phthisis, asthma, and other affections of the respiratory organs.

Cones of Iodine.

Take of Iodine	77 grains,	
Marshmallow powder	10 drachms,	
Nitrate of potassa	8 "	45 grains,
Alcohol, water, each	q. s.	

Triturate the iodine with sufficient alcohol till reduced to a very fine state of division; add the nitre and marshmallows, and make an intimate mixture, and by means of water form a paste sufficiently firm to manipulate, then form it into ten cones of equal size and shape. Lastly dry them.

In the same way prepare *Cones of Iodide of Sulphur.*

Cones of Cinnabar.

Take of Marshmallow powder	ten drachms,
Saltpetre	ten drachms,
Cinnabar	five drachms,
Water	q. s.

Mix to a firm paste and divide into ten cones.

Cones of Stramonium.

Take of Powdered stramonium leaves	10 drachms,
Saltpetre	10 drachms,
Marshmallow or Lycopodium	2½ drachms,
Water	q. s.

Make sufficient mucilage with water and marshmallows to form

with the other substances a consistent mass and divide it into ten cones.

In the same way prepare *Cones of Belladonna and Digitalis.*

Cones of Tar.

Take of	Purified tar	450 grains,
	Powdered marshmallow	525 "
	Saltpetre	525 "

Mix and divide into ten cones.

In the same way prepare *Cones of Tolu.*

Cones of Opium.

Take of	Marshmallow powder,	
	Saltpetre in powder, each	ten drachms,
	Opium, powdered	39 grains,
	Water	q. s.

Mix and make ten cones.

Cones of Camphor.

Take of	Powdered camphor	450 grains,
	Powdered saltpetre	450 "
	Powdered marshmallow	750 "
	Water	q. s.

For ten cones.

Besides these cones of *sugar, poplar buds, benzoin* and *of oxide of zinc* are recommended.

All these cones after preparation should be dried in a stove and preserved in a dry place.—*Jour. de Chim. Méd.*

Preparation of Mercurial Ointment.—Eugene Renoult recommends the following method (*Jour. de Chim. Méd.*) for preparing quickly this ointment:—

Take of	Lard and mercury, of each	16 ounces,
	Ether	an ounce.

Into a mortar of marble or iron put the mercury with one half the lard, and half the ether, and triturate quickly. Under the influence of cold produced by the vaporization of ether, the mercury is divided into minute droplets and is promptly absorbed. The other part of the ether and lard are then added, and the trituration continued until the mercury is completely extinguished. The ointment is left in contact with the air for

five or six hours, with the precaution to agitate it from time to time so as to favor the vaporization of the last traces of the ether,—when it is finished.

Candles for poisoning rats.—M. Séverin Caussé (d'Alby) has adopted Tartar Emetic as a rat poison. To prevent mistakes, he has given the poison the form of candles; here is the formula:—

Suet	786 grains,
Tartar Emetic	153 "
Euphorbium	51 "
Cotton	10 "
Aventurine	a pinch,

Make into thirty-two candles.

Admitting the mixture to be perfect, each gramme of suet (15 grs.) contains 15 centigrammes (1½ grs.) of Tartar Emetic and ¼ a grain of Euphorbium.—*Jour. de Chim. Méd.*

ON THE PUBLICATION OF THE REVISED PHARMACOPŒIA.

By Edward Parrish.

Two and a half years have now elapsed since the Convention met in Washington, to give official sanction to the decennial revision of the National Standard, and we are not yet publicly apprised of the changes which have met the approval of the Committee, and are to be binding upon us all until the time of the next decennial Convention.

It is with no disposition to find fault with the Committee of revision, and I hope with a full appreciation of the difficulties attendant on the trust committed to them, that I design in this paper to give a concise statement of the reasons urged on all hands as calling for the speedy publication of the work.

1st. The Pharmacopœia of 1850 is universally felt to be behind the times; in fact the holding of the Convention of 1860 and the appointment of the Committee of revision and publication, are evidences of this universally admitted fact.

2d. Sufficient is known of the proposed modifications, to have unsettled the practice of many Pharmaceutists and to have interfered with the uniformity which it is the object of the

Pharmacopœia to secure. The publication in advance of many proposed changes, the labors of several Committees of Revision, the report of one of which was published previous to the Convention—the use of many of the proposed new officinal formulæ by the College of Pharmacy of Philadelphia, in the preparation of the Cabinet forwarded to the Great Exhibition in London, and the unofficial announcement of the proposed changes, made in detail by a member of the Committee of Revision at the late meeting of the American Pharmaceutical Association, have all tended to this unsettlement.

3d. The present season of the year is one in which the want of the new National Standard is particularly felt by the teachers and students at the several Medical and Pharmaceutical Schools. To teach as officinal, formulæ ten years old, which are about to be superseded, to classes just receiving their first instructions in Materia Medica and Pharmacy, could only be justified by absolute necessity.

4th. Whatever may be the fact, there is a general impression that no such necessity exists, the ordeal through which the proposed changes have passed, first in the preliminary revisions, which were carefully conducted by competent physicians and pharmaceutists, and with the advantages of discussion in large Committees; secondly, through the journals, where some of them have been ably presented and discussed; and thirdly, in the Committee of final revision which has met weekly during nearly all of this long period, and has verified results by many experiments and the most careful scrutiny, must have been ample for every necessary purpose. So thinks every pharmaceutist and physician outside the Committee with whom I have conversed.

5th. The progressive spirit of our age and country is at war with every delay which appears unnecessary, and especially with a delay that might be construed as involving an uncertain or precarious idea of Nationality. Let us have our American Pharmacopœia which will doubtless be more characteristic and distinctive than ever before, and which it is to be hoped will come in time to be stamped upon the memory of the thousands of young men under instruction during the present winter term, as candidates for the medical and pharmaceutical professions.

Moreover let us have a large edition, cheap as becomes a brief and concise work, edited without expense, and let it be so thoroughly advertised and introduced, that it will cease to be as formerly a curiosity in drug stores and the offices of physicians, not one of which can with propriety be without it.

ON THE WEIGHT OF A FLUIDOUNCE OF WATER.

By Dr. W. H. Pile.

The problem of reducing weight to measure, as in the determination of the weight of a definite bulk of water, although apparently a very simple operation, involves processes so complicated and delicate, that the question is still an open one, notwithstanding the most acute observers of modern times have entered into the investigation and pursued it diligently for years. The governments of England and France, and we may add our own also, in their endeavors to have this fundamental inquiry settled, have employed the utmost skill and ingenuity available, in devising mechanical means for overcoming difficulties; some of these are, however, in their very nature insurmountable, and the utmost that we may expect is a nearer approach to accuracy as modern science devises new means, and more refined investigations are instituted.

The above remarks are made introductory to a question referred to me, as to the weight of a fluidounce of water, and the determinations of various authorities on this point are given below, collected from such sources as I have been able to meet with.

The United States (see Alexander on weights and measures) define a gallon of water, of 231 cubic inches, at its greatest density, 39·83° F., and Bar. 30 inches, to weigh 58372.1754 troy grains and the fluidounce 456.0326 grs.

According to Kopp's table on the expansion of water, reduced by myself, (see Amer. Jour. Phar. for 1860) when a bulk of water is assumed to weigh 1000 grs. at 60° F., a similar bulk will weigh at its greatest density 1000·902 grs. The fluid ounce of the United States standard at 60° F. would consequently weigh $\frac{456.0326}{1000.902}$ or 455·6216 grains.

In the Dispensatory by Wood and Bache, the fluidounce is

stated to weigh 455·6944 grains. This result appears to be derived from Sir G. Shuckburg's experiments, which give the cubic inch of water at 60° F. as 252·506 grains; the fluidounce, therefore would equal $\frac{231}{128}$, or 455·6944 grains.

In a report to the British House of Commons in 1821, (see Penny Cyclopedia, art. Standard,) the cubic inch of water at 62° F. is declared to weigh in vacuo 252·72 grains of the standard pound of 1758,* while in a final report made 1835, adopted and at present in force, the cubic inch of water at 62° F. weighed in the air, with brass weights, bar. 30 inches, equals 252·458 grs. or the fluidounce 455·6094 grains. This latter weight reduced to the temp. of 60° F. by Kopp's table as above, would equal 455·6910 grains. Reduced by other tables the result would vary slightly.

The question is thus seen to be not susceptible of a definite answer, and although the true result may be classed among the constants of the mathematician, yet obstacles to its rigid determination will ever remain insuperable.

By comparing the results as above given, we find at the temp. of 60° F. and Bar. 30 in.

the United States standard fluid ounce	455·6216 grains.
Sir G. Shuckburg	455·6944 "
British standard	455·6910 "
Average weight (mean of the above,)	455·6690 "

ON THE JUICE OF THE FRUIT OF SOLANUM LYCOPERSICUM (TOMATO.)

By Jno. Bapt. Enz.

The fruit of the Solanum lycopersicum, cultivated in the gardens at the foot of the Donnersberg, and which in its fresh ripe condition is of a beautiful scarlet red color, was collected, bruised in a stone mortar with a wooden pestle, and placed in

*As an historic fact it may be mentioned, that the great fire which destroyed the British Houses of Parliament in 1834, also destroyed the standard weights alluded to in the act. As this loss has never been replaced, there is consequently no legal standard at present in Great Britain.

a warm situation for three days. The juice was then strained off, with expression, and filtered.

The filtrate was of a wine color, clear and strongly acid. By boiling it was coagulated. By a second filtration the coagulum was separated, but it amounted to so little that I was obliged to limit myself to but a single experiment. I heated it, after washing and drying, in a glass tube closed at one end, and noted the appearance of alkaline vapors, smelling like heated horny matter, indicating albumen.

The filtered juice reacted as follows, viz.

Ammonia produced, in the cold, no change; on boiling, a white pulverulent precipitate.

Solution of potassa—a reddish brown color; on boiling, a flocculent precipitate.

Nitrate of silver—a dense cloud; and on standing, a light precipitate, which did not entirely dissolve in nitric acid.

Chloride of barium—gradually a precipitate not entirely soluble in muriatic acid.

Chloride of calcium, chloride of iron, ferrocyanide of potassium, produced no change in the juice.

Oxalate of ammonia threw down immediately a dense, firm precipitate—this being filtered off, phosphate of ammonia caused a slight precipitate.

Tartaric acid produced a crystalline deposit.

Lime water occasioned gradually a slight turbidity; on boiling, a white flocculence separated, which was partly soluble in a solution of sal ammoniac. The portion not soluble in sal ammoniac, dissolved, after washing, in dilute nitric acid, in which solution molybdate of ammonia produced a citron yellow precipitate.

After lime water had thus thrown down a white flocculent precipitate by boiling, the mixture was, upon cooling, immediately filtered, and the filtrate boiled. No turbidity was produced,—the solution remaining as clear as water. I conclude from this that no citric acid is contained in the juice.

Neutral acetate of lead caused a dense white precipitate: this was partially dissolved in acetic acid. Boiled with water and filtered while hot, the filtrate deposited, on further dilution with water and cooling, a small amount of a crystalline powder.

That portion of the precipitate by acetate of lead, insoluble in water, was, after washing and drying, found to be entirely soluble in liquor potassa and in nitric acid.

This precipitate by acetate of lead, when powdered, and heated in a dish, became blackened. On treating the blackish mass with dilute acetic acid, a residue remained, which, heated on charcoal, threw out polyhedral particles.

Another portion of the precipitate by lead was digested with a solution of carbonate of ammonia. The yellowish white filtrate separated from the carbonate of lead did not yield, upon the addition of acid in excess, any gelatinous mass of pectic acid.

The liquid separated from the precipitate by lead, yielded upon the addition of the basic acetate of lead only a slight yellow colored precipitate, which washed, decomposed by sulphuretted hydrogen, and filtered off from the sulphuret of lead, gave an acid liquid producing no reaction with lime water in the cold; on boiling, a flocculence separated, which did not disappear on cooling. A part of the acid liquid was evaporated to a syrup, and mixed with alcohol, whereby white flocks of gum were thrown down.

The liquid separated from the precipitate produced by the basic acetate of lead was freed from excess of lead by carbonate of ammonia, and the filtrate evaporated to a syrupy consistence. A reddish brown mass of sweet, sour, salty though not bitter, taste is left, which was almost entirely dissolved in alcohol.

A solution of sulphate of copper mixed with tartaric acid, added to the filtrate previously made alkaline, produced a considerable yellowish red precipitate. Lime water made no further change, neither in the cold, nor on heating. Chloride of barium did not affect it. Nitrate of silver was immediately blackened.

With the remainder of the concentrated filtrate a reaction was attempted with lactic acid, but with negative results.

A portion of the juice of the fruit was evaporated to a syrupy consistence, and, since nothing crystallized from it, digested with ether. The ethereal solution separated from the syrup was of a golden yellow color: it was evaporated to dryness, and the mass treated with water. The aqueous solution left behind a small amount of resinous matter: filtered from this, it possessed

a yellow color, and clear acid taste. Sugar of lead caused a yellow flocculent precipitate in it, which collected together upon heating; and was entirely soluble in acetic acid. Chloride of zinc produced no alteration in the cold; upon heating, a flocculent turbidity.

The residue of the extract was now treated with alcohol, which, however, left a considerable portion undissolved.

The alcoholic solution, slowly evaporated to dryness, yielded a mass which, with the exception of a very minute quantity of resin, was soluble in hot water. After cooling and filtering, the liquid possessed a reddish brown color, was clear, and had a sweetish acid taste.

A solution of sulphate of copper mixed with tartaric acid produced in the filtrate previously rendered alkaline, when warmed, a considerable yellowish red precipitate.

A portion of the filtrate was mixed with a few drops of chloride of iron, heated nearly to boiling, liquor potassa added, boiled and again filtered. In this filtrate the presence of iron was indicated by a black precipitate with sulphuretted hydrogen.

From this I infer the presence of tartaric acid; there had been formed the tartrate of iron and potassa, which remained in solution by the presence of free alkali, and yielded its iron only upon the addition of sulphuretted hydrogen. At least neither malic nor citric acid would have afforded an alkaline solution *containing iron* under these circumstances.

Another portion of the aqueous solution of the alcoholic extract, mixed with sugar of lead, gave a flocculent precipitate, which collected upon heating, and dissolved with but a very small residue in acetic acid. The remainder of the aqueous solution of the alcoholic extract was evaporated to the consistence of an extract, and heated in a test tube with a few drops of sulphuric acid—frothing was produced, and the disengagement of pungent acid vapors of malic acid—which crystallized upon the cooler part of the tube.

The portion of the ethereal extract insoluble in alcohol dissolved completely in water, forming a clear reddish brown solution. This solution was insipid to the taste, somewhat salty, neither bitter nor astringent. Chloride of iron produced in it no change.

Acetate of lead caused immediately a flocculent precipitate, partly soluble in acetic acid.

Mixed with potassa and a solution of sulphate of copper, a deep bluish green solution, without any precipitate, immediately was formed, not changing by standing; upon boiling, a red crystalline precipitate of oxide of copper was promptly deposited.

When a half ripe fruit is cut in two, and moistened with a few drops of tincture of iodine, a blue color is immediately produced.

A decoction of the fruit with tincture of iodine gives a dark blue precipitate.

According to the foregoing examination the juice of the fruit of Solanum lycopersicum contains the following substances:

Potassa, lime, and some magnesia, in combination with malic, tartaric, phosphoric, and sulphuric acids, chlorine, a gum resembling dextrine, albumen, starch, cellulose, fatty and resinous matters, red coloring matter, and sugar.

Solanin could not be found in the juice; this would have been betrayed by its bitter, nauseous, harsh taste. The seed, however, yielded an alcoholic extract of a bitter and penetrating taste, containing probably solania, with which I propose making further experiments.

The aqueous solution of the contents of the retort deposits a Kermes colored powder, which, when washed with diluted alcohol, is slightly dissolved, yielding a brownish red colored liquid.

Finally 6 ounces of the juice freshly strained from the ripe fruit, moistened with phosphoric acid, were subjected to distillation. The distillate reacted and tasted decidedly acid, but did not decolorize the indigo solution; it gave upon neutralization with caustic baryta, filtration and subsequent evaporation, a salt, which when wet with sulphuric acid, in the presence of one of the organic ethers, evolves a distinct odor of acetic acid.— *Vierteljahresschrift*, xi. *Band* 3 *Heft.* G. J. S.

ON THE CHEMISTRY OF OPIUM.

By Dr. T. Anderson.

Since the year 1803, opium has attracted the attention of chemists; of late years the principal point aimed at had been

the preparation of morphine in a pure state. In extracting the opium in order to obtain the bases, it was better to use only a small quantity of water heated to about 150° F., in which case all the narcotine would be dissolved out, and only woody fibre left; but if a large quantity of water were used, the narcotine was left behind in the insoluble residue. The alkaloids existed in combination with a peculiar organic acid called meconic acid, and another acid had been discovered in opium which was isomeric with lactic acid. The liquid obtained by extraction with water was mixed with a certain quantity of chloride of calcium, and the precipitated meconate of lime separated, after which the solution was concentrated and allowed to stand, when hydrochlorate of morphine and hydrochlorate of codeine crystallized out; these bases could be easily separated by precipitation by ammonia, the codeine being soluble in water. It was generally supposed that the codeine formed a double salt with ammonia, but from Dr. Anderson's experiments this did not appear to be the case. The mother-liquor from which the hydrochlorates had been deposited gave, on the addition of ammonia, a precipitate containing narcotine, papaverine, thebaine, and codeine, together with numerous resinous matters; the presence of the last-mentioned base in the precipitate was remarkable on account of its solubility in water. On dissolving this precipitate in alcohol and crystallising, narcotine was deposited, the other bases remaining in solution; and Dr. Anderson imagined that this solution contained a base which had not as yet been noticed. The original mother-liquor from which the ammonia precipitate had been separated still contained bases, which might be extracted by agitating with ether. From the ethereal solution meconine could be obtained. The products of decomposition of narcotine under the action of reagents were very interesting. The composition of this alkaloid had been determined by different experimenters, and their results did not altogether agree; for the three formulæ, $C_{44}H_{23}NO_{14}$, $C_{46}H_{25}NO_{14}$, and $C_{48}H_{27}NO_{14}$, had been given, which had been explained by the supposition that there existed three alkaloids agreeing very closely in their properties, and named methylo-, ethylo-, and propylo-narcotine, on account of the decomposition they underwent when passed over soda lime, the three yielding respectively

methylamine, ethylamine, and propylamine. By the action of oxydising agents, narcotine might be separated into a basic substance called cotarnine, $C_{24}H_{11}NO_6$, and an indifferent body, which was meconine; three acids being produced at the same time,—namely, opianic acid, $C_{20}H_{10}O_{10}$, hemibanic acid, $C_{20}H_{10}O_{12}$, and a third acid body of the composition $C_{20}H_{10}O_8$. Cotarine when acted on by nitric acid, gave an acid containing $C_{16}H_7NO_8$, called apophyllic acid. This acid might be considered as compounded of methylamine and an acid of the formula $C_{14}H_4O_{10}$, and, in fact, when boiled with potash, underwent decomposition, giving off methylamine. On dissolving narcotine in dilute suphuric acid, and exposing it in sealed tubes to a temperature of 300° F., crystals are seen to form, which contain meconine; coloring matter and a humic substance being formed at the same time, while the solution is found to contain cotarnine. When opianic acid is mixed with concentrated sulphuric acid, a purple liquid is produced, which on dilution furnishes a redish coloring matter which has the properties of alizarin. With regard to the composition of the various substances found in opium, some relation between the different bases might be discovered. Codeine was homologous with morphine, as far as the formula was concerned; but this relation was not borne out by the properties of the two bases, which were very different. The other bases also showed, in some cases, a relation in composition. Several of these alkaloids, when exposed to the action of nitric acid, gave rise to substitution products. The substitution product of codeine could only be prepared by employing a very dilute acid; if stronger acids were used, a resinous acid was obtained, which, when boiled with potash, gave rise to a volatile base. This last reaction was very common among the group of alkaloids. With regard to the variations in the relative proportions of the various bases contained in opium, that obtained from China contained a large amount of narcotine and very little morphine; while the opium from Egypt contained scarcely any meconic acid, its place being taken by sulphuric acid.

Mr. Foster said that from the experiments that he had made in conjunction with Dr. Matthiesson, it appeared that the composition of cotarnine was represented by the formula $C_{24}H_{13}NO_6$, so that cotarnine and meconine together exactly

made up narcotine. They had found that oxidation of meconine furnished an acid containing $C_{20}H_{10}O_{10}$. The action of sodium amalgam on narcotine furnished a basic substance, which appeared to be cotarnine. This reaction was interesting, because it was the reverse of the action of nitric acid, which also gave rise to cotarnine. They represented cotarnine by the rational formula $\begin{bmatrix}(C_{22}H_{10}O_6)''\\ C_2H_3\end{bmatrix}$ N, for the action of nitric acid on this body furnished an acid of the formula $C_{22}H_{12}O_{10}$, and on dissolving cotarnine in hydrochloric acid and heating, a decomposition ensued, chloride of methyl and a body of the formula $C_{22}H_{13}NO_8$, HCl being formed. From their experiments on the decomposition of narcotine by soda lime, it appeared that under these circumstance trimethylamine was formed, which had been mistaken for propylamine on account of its platinum salt containing the same per-centage of metal.

Dr. Redwood remarked that he entertained doubts as to the absence of meconic acid in a genuine sample of opium. He had invariably found it to be present in a great number of samples which had come under his notice.

Mr. Morson observed that meconic acid was always present in opium, unless it had been removed by lime or a similar agent.—*Chem. News, London, May* 10, 1862, *from Proc. Chem. Society.*

ON THE CALCINATION OF MAGNESIA AND THE MEANS OF TESTING ITS PURITY.

By M. Amédée Vée.

Calcination of magnesia is an operation so simple, that at first sight it is not easy to comprehend how it can be made the subject of fresh observations, or how it can, in any case, fail to succeed. It is, however, constantly made evident that this is not the case, and that commercial magnesia, without speaking of its impurities, which have lately been much insisted upon, is far from possessing the physical properties which ought to pertain to it; it is dense, granular, very slightly attackable by diluted acids, and is with difficulty held in suspension in water. No way of avoiding these defects has hitherto been known ex-

cept by preparing very small quantities at a time, and by stirring the carbonate with an iron spoon during calcination, as advised in the Codex. These plans cannot be adopted in wholesale manufacture, and there are now large *special factories* for the calcination of magnesia. A long time is necessarily taken up in calcining large quantities of carbonate, because the heat penetrates with difficulty to the centre of the mass, the periphery of which during the operation undergoes the action of a very high temperature; the heat, in fact, must be very great, for, in order to make as much use of the crucible as possible, the carbonate is heaped up, and thus forms an obstacle to the escape of the gases. With the help of my brother, M. L. Vée, civil engineer, I have succeeded in overcoming these difficulties, by constructing a furnace wherein the carbonate of magnesia, spread in a layer, not thicker than seven centimètres, is submitted to the action of the degree of heat strictly necessary to decompose it, I will briefly describe the principal features of the apparatus.

It consists of a furnace and two retorts. There is no peculiarity in the construction of the furnace. The retorts are of cast iron, in shape rectangular; their height is only 10 centimètres, their breadth 60, their depth 70. The opening, occupying the whole of one of their smaller sides, is shut by means of a cast iron slab, fitting in a groove, and held in place by collars. The retorts are placed one above another, opening on one of the sides of the furnace, which are perpendicular to that in which the furnace-door is situated.

The direct action of the fire is on the lower retort; the product of the combustion passes round the back of it to reach and heat its upper surface, and the lower part of the other retort, round which it also passes before escaping up the chimney. The result of this arrangement is, that the lower retort becomes red hot, and the bottom of the upper retort somewhat less so. The decomposition begins in the upper retort, and is finished in the lower.

The carbonate must not be directly introduced into the retorts; fearing, but, as experience has shown me, without reason, to let the iron come in contact with the magnesia, I decided upon employing earthen cases, notwithstanding their weight,

their fragility, and the length of time required to heat them, when it occurred to me to heat a fragment of sheet iron with magnesia, in a platinum crucible. I found that when not left too long in contact or at too high a temperature, the product was white, and not perceptibly more ferruginous than the carbonate which furnished it. So that I had sheet iron cases made in which to put the carbonate to be introduced into the retorts. The use of sheet iron is, however, not without its inconveniences; it becomes covered with a coat of oxide, which generally detaches itself in lamels, which require to be sifted from the magnesia. Occasionally this oxide is pulverulent, but it does not mingle with the mass if care is taken to leave a small layer of magnesia in the case to protect the rest in the following operations; the heat puts the cases out of shape, and thin sheet iron must be used, that there may be no difficulty in removing the cases in and out of the furnace. These defects are compensated by the lightness of the case, the little space it occupies, and the facility with which it is heated and cooled.

To produce complete decomposition the carbonate should remain 45 minutes in each retort. Thus, every three-quarters of an hour a case of magnesia is taken from the lower retort, and immediately replaced by a case of partially decomposed carbonate from the upper retort, into which a fresh case of carbonate is then introduced. The operation is continuous and the consumption of fuel small, because it is never necessary to cool the furnace.

Prepared in this way, magnesia is as light as is the hydrocarbonate. It combines easily with water, and dissolves immediately in diluted acids.

In the course of my analyses, I have had occasion to examine a great number of samples of magnesia, derived from various sources, and I have never yet found a single specimen of magnesia or carbonate completely free from lime, neither have I found one containing a sufficient quantity to offer any inconvenience. I cannot say that the admixture with a considerable quantity of lime can never be the case; but I think it would be quite exceptional, perhaps because attention has been called to this point by recent publications. In this analysis, I have always adopted the following plan, which I will briefly describe; for

though there is nothing absolutely new in it, yet this analytical method seems to me to give all the information necessary for appreciating any sample of magnesia by the aid of reagents to be found in every chemist's shop, without exacting any special skill like that required in an analysis by the bichloride of mercury. Weigh 1 gramme of magnesia, put it in a tared vessel, and dissolve it with a little diluted sulphuric acid; the solution should take place instantaneously, leaving no perceptible residuum. Then add 100 grammes of the solution to some water; shake it, and divide into two equal parts. With one portion mix 50 grammes of commercial spirits of wine, which precipitates the sulphate of lime; directly if there is much of it, in a few minutes if it exists in small proportion. Supersaturate the other half of the solution with ammonia; if the specimen contains any alumina this will be deposited colored by oxide of iron; this coloration often fails, but the flakes of alumina almost always assume a dark green color by the addition of a few drops of soluble sulphide.—*Chem. News, September* 20, 1862, *from Répertoire de Chimie pure et Appliquée.*

A NEW USE FOR CARBOLIC ACID.

J. E. Ashby, LL.D., writes from Enfield to the *Mechanics' Magazine* as follows:—"Most persons have by this time heard that there is such a substance as carbolic acid; comparatively few have seen it, fewer still have used it, and no one (so far as I can find) has yet noticed a very remarkable property which it possesses in relation to practical mechanics. For the information of those to whom the substance itself is unknown, a word or two will be sufficient to introduce it to their notice. Carbolic acid is one of the products of the destructive distillation of coal, and till within a few years vast quantities of it were utterly wasted. When perfectly pure it is a white crystalline solid, which by absorbing water soon changes into a colorless refractive liquid, having a faint odor of roses and tar. It is not an acid in the popular sense, not being either sour or corrosive, and should therefore, perhaps, be generally designated by its other title of phenole. Crude carbolic acid may be obtained in bulk for a shilling per gallon, and is a dark tarry liquid, containing,

perhaps, from ten to twenty different substances, in a state of mechanical admixture. Fortunately, this crude acid is available for the purposes to which I invite the attention of your readers. Just as oil is an anti-frictional liquid, so is phenole pro-frictional: or, to state it more correctly, as oil appears to keep surfaces in motion asunder by interposing a thin film between them, so phenole appears to make them bite and bind, by bringing them into absolute contact (after a manner of speaking), and removing even the finest film from between them. Any one may convince himself of this by placing a little upon a perfectly clean and dry oil-stone, and then rubbing up the face of a broad chisel upon it. The sensation of the bite (I know no other word to express it) is very curious, and renders any further explanation unnecessary; it seems as if the stone and the steel had absolutely nothing between them, or even as if they were positively brought together by some attractive force. I have applied this property of carbolic acid to the following operations:—grinding, filing, boring, and sawing in metal, with great apparent advantage. When dissolved in fifteen parts by measure of methylated alcohol, it forms a milk-white emulsion if poured into water, and it may be worth while to ascertain whether such carbolated water would facilitate the ordinary work of the grindstone, a point on which I am not able to speak with certainty. If any of your readers should experience, as I did, much difficulty in obtaining the crude carbolic acid, I shall have much pleasure in indicating the source whence mine was derived, or in supplying any practical engineer with a small sample so long as my little quantity holds out."—*Chem. News, July* 26, 1862.

ON THE PREPARATION OF CAUSTIC SODA.

By M. Woehler.

This process consists simply in calcining nitrate of soda with peroxide of manganese. No chameleon is formed, as might be supposed, since the nitrate decomposes long before the mixture can reach the temperature necessary for the production of manganic acid.—*Chem. News, from Annalen der Chemie and Pharmacie.*

ON THE HISTORY OF PETROLEUM OR ROCK OIL.

By T. Sterry Hunt, M. A., F.R.S., of the Geological Survey of Canada.

Public attention has lately been drawn to the petroleum furnished by the oil wells in Canada and the United States, and we have, therefore, thought it well to bring together some few facts which may serve to explain the origin of this and of similar substances, including naphtha, petroleum, or rock oil, and asphalt, or mineral pitch, all of which are forms of bitumen, the one being solid, and the others fluid at ordinary temperatures. These differences are, in many cases at least, due to subsequent alterations; the more liquid of these substances are mixtures of oils differing in volatility, and by exposure to the air become less fluid, and partly by evaporation, partly by oxidation from the air, eventually become solid, and are changed into mineral pitch. These substances, which are, doubtless, of organic origin, occur in rocks of all ages, from the Lower Silurian to the tertiary period inclusive, and are generally found impregnating limestones, and, more rarely, sandstones, and shales. Their presence in the lower palæozoic rocks, which contain no traces of land plants, show that they have not been in all cases derived from terrestrial vegetation, but may have been formed from marine plants or animals: the latter is not surprising when we consider that a considerable portion of the tissues of the lower marine animals is destitute of nitrogen, and very similar in chemical composition to the woody fibre of plants. Besides the rocks which contain true bitumen, we have what are called bituminous shales, which when heated burn with flame, and by distillation at a high temperature yield, besides inflammable gases, a portion of oil not unlike in its characters to petroleum. These are, in fact, argillaceous rocks intermixed with a portion of organic matter allied to peat or lignite, which by heat is decomposed, and gives rise to oily hydrocarbons. These inflammable or lignitic shales, which may be conveniently distinguished by the name of *Pyroschists* (the *brandschiefer* of the Germans,) are to be carefully distinguished from rocks containing ready-formed bitumen; this being easily soluble in benzole or sulphuret of carbon, can be readily dissolved from the rocks in which it

occurs, while the pyroschists in question yield, like coal and lignite, little or nothing to these liquids.

It is the more necessary to insist upon the distinction between lignitic and bituminous rocks, inasmuch as some have been disposed to regard the former as the source of the bitumen found in Nature, which they conceive to have originated from a slow distillation of these matters. The result of a careful examination of the question has, however, led us to the conclusion that the formation of the one excludes more or less completely that of the other, and that bitumen has been generated under conditions different from those which have transformed organic matters into coal and lignite, and probably in deep water deposits from which atmospheric oxygen was excluded. Thus, in the palæozoic strata of North America we find in the Utica and Hamilton formations highly inflammable pyroschists which contain no soluble bitumen, and the same is true to a certain extent of some limestones; while the Trenton and Corniferous limestones of the same series are impregnated with petroleum or mineral pitch, and, as we shall show, give rise to petroleum springs. The fact that intermediate porous strata of similar mineral characters are destitute of bitumen, shows that this material cannot have been derived from overlying or underlying beds, but has been generated by the transformation of organic matters in the strata in which it is met with. This conclusion is in accordance with that arrived at by Mr. S. P. Wall in his recent investigations in Trinidad. He has shown that the asphalt of that island and of Venezuela belongs to strata of the tertiary formation (of upper miocene or lower pliocene age,) which consists of limestones, sandstones, and shales, associated with beds of lignite. The bitumen is found not only in the famous pitch lake, but *in situ* where it is confined to particular strata which were originally shales, containing vegetable remains. These have undergone "a special mineralization, producing a bituminous matter instead of coal or lignite. This operation is not attributable to heat, nor of the nature of a distillation, but is due to chemical reactions at the ordinary temperature, and under the normal conditions of climate." He also describes wood partially converted into bitumen, which last, when removed by solution, leaves a portion of woody tissue. (Proc. Geol. Soc. London, May, 1860.)

The sources of petroleum and mineral pitch in Europe and in Asia are for the most part, like those just named, confined to rocks of newer secondary and tertiary age, though they are not wanting in the palæozoic strata, which in Canada and the United States furnish such abundant supplies of petroleum. In the great palæozoic basin of North America, bitumen, either in a liquid or solid state, is found in the strata at several different horizons. The forms in which it now occurs depend in great measure upon the presence or absence of atmospheric oxygen, since by oxidation and volatilisation the naphtha or petroleum, as we have already explained, becomes slowly changed into asphalt or mineral pitch, which is solid at ordinary temperature. It would even appear that by a continuance of the same action the bitumen may lose its fusibility and solubility, and become converted into a coal-like matter. Thus, in the calciferous sandrock in New York a black substance, which has been called anthracite, occurs in cavities with crystals of bitter spar and quartz. It sometimes coats these crystals or the walls of the cavities, and at other times appears in the form of buttons or drops, evidently, according to Mr. Vanuxem, having been introduced into these cavities in a liquid state, and subsequently hardened as a layer above the crystals which have conformed to them, showing that this coal-like matter was once in a plastic state. It is very pulverulent, brittle, of a shining black, and according to Vanuxem, yielded but little ash and 11½ per cent. of volatile matter, which he regarded as water (Vanuxem, Geology of New York, iii. 33.) A similar material occurs in the Quebec group in Canada, the equivalent of the calciferous sandrock, and fills cavities and fissures in the limestones, sandstones, and even in the accompanying trap rocks, as at Quebec, Orleans Island, Point Levis, and at Acton, presenting mamillary surfaces, as noticed by Vanuxem, which evidently show that it has once been semi-fluid. This matter from the first two localities is completely infusible, and insoluble in benzol; it readily crumbles between the fingers, and gives a very black powder. When exposed to a high temperature it gives off abundance of inflammable strong-smelling vapors, which condense into a tarry oil, and leave a black residue, which when heated slowly burns away, leaving only a trace of ash. The volatile

portion is equal to from 19·5 to 21·0 per cent. The mineral from the Acton copper mine is much harder and less friable, and approaches to anthracite in its characters. When heated it gives off watery vapor without any bituminous odor. Its loss by heat was 6·0 per cent., and the residue of ash was equal to 2·2 per cent.

An evidence of the presence of the unaltered petroleum in almost all the Lower Silurian limestones is furnished by the bituminous odor which they generally exhibit when heated, struck, or dissolved in acids. In some cases petroleum is found filling cavities in these limestones, as at Rivière à la Rose (Montmorenci,) where it flows in drops from a fossil coral of the birdseye limestone; and at Pakenham, where it fills the cavities of large orthoceratites in the Trenton. From some specimens nearly a pint of petroleum has been obtained. It is also said to occur in the township of Lancaster in the same formation. The presence of petroleum in the Lower Silurian rocks of New York is shown in the township of Guilderland, near Albany, where, according to Beck, considerable quantities of petroleum are collected upon the surface of a spring which rises through the Hudson River or Loraine shales. On the great Manitoulin Island, also, according to Mr. Murray, a petroleum spring issues from the Utica State, and he has described another at Albion Mills, near Hamilton, rising through the red shales of the Medina group; these have probably their origin in the Lower Silurian limestones, which may in some localities prove to be valuable sources of petroleum.

In the Upper Silurian and Devonian rocks bitumen is much more abundant. Eaton long since described petroleum as exuding from the Niagara limestone, and this formation throughout Monroe County, in western New York, is described by Mr. Hall as a granular crystalline dolomite, including small laminæ of bitumen, which gives it a resinous lustre. When the stone is burned for lime the bitumen is sometimes so abundant as to flow like tar from the kiln. In the Corniferous limestone, at Black Rock, on the Niagara River, petroleum is described as occurring in cavities, generally in the cells of fossil corals, from which, when broken, it flows in considerable quantities. It also occurs in similar conditions in the Cliff limestone (Devonian) of Ohio.

Higher still in the series, at the base of the Hamilton group, occur what in New York have been called the Marcellus shales; these enclose septaria or concretionary nodules, which contain petroleum, while at the summit of the same group similar concretions, holding petroleum, are again met with. The sandstones of the Portage and Chemung group, in New York, are in many places highly bituminous to the smell, and often contain cavities filled with petroleum, and in some places seams of indurated bitumen. A calcareous sandstone from this formation, at Laona, near Fredonia, in Chatauque County, contains more than two per cent. of bituminous matter. At Rockville, in Alleghany County, according to Mr. Hall, the same sandstones are highly bituminous, and give out a strong odor when handled, and in the counties of Erie, Seneca, and Cataraugus, abundant oil springs rise from the sandstones, and have been known to the Seneca Indians from ancient times. In the northern part of Ohio, according to Dr. Newberry, petroleum is found to exude, in greater or less quantity, from these sandstones wherever they are exposed, and the oil wells of Pennsylvania and Ohio are sunk in these Devonian sandstones, often through the overlying carboniferous conglomerate, and in some cases apparently, according to Newberry, through the sandstones themselves, which are supposed by him to be only reservoirs in which the oil accumulates as it rises through fissures from a deeper source, in proof of which he mentions that, in boring wells near to each other, the most abundant flow of oil is met with at variable depths. In some instances the petroleum appears to filter slowly into the wells from the porous strata around, which are saturated with it, while at other times the bore seems to strike upon a fissure communicating with a reservoir which furnishes at once great volumes of oil. An interesting fact is mentioned in this connection by Mr. Hall. In the town of Freedom, Cataraugus County, New York, is a spring which had long been known to furnish considerable quantities of petroleum. On making an excavation about six yards distant, to the depth of fourteen feet, a copious spring of petroleum arose, and for some time afforded large quantities of oil, after which the supply diminished in both the old and new springs, so that it is now less than at the first settlement of the country. Notwithstanding its general distri-

bution throughout a considerable region in the adjacent portions of New York, Pennsylvania, and Ohio, it is only in a few districts that it has been found in quantities sufficient to be wrought with profit. The wells of Mecca in Trumbull County, Ohio, have been sunk from 30 to 200 feet in a sandstone which is saturated with oil; of 200 wells which have been bored, according to Dr. Newberry, a dozen or more are successfully wrought, and yield from five to twenty barrels a-day. The wells of Titusville, on Oil Creek, Pennsylvania, vary in depth from 70 to 300 feet, and the petroleum is met with throughout. The oil from different localities varies considerably in color and thickness, and in its specific gravity, which ranges from 28° to 40° B. (from ·890 to ·830.)

The Valley of the Little Kenawha, in Virginia, which is to be looked upon as an extension of the same oil-bearing region, contains petroleum springs, which, so long as 1836, according to Dr. Hildreth, yielded from fifty to a hundred barrels yearly. It here rises through the carboniferous strata, and, as elsewhere, is accompanied by great quantities of inflammable gas.

The black inflammable shales of the Devonian series in Western Canada, which were formerly referred to the Hamilton group, and are now considered to belong to the base of the overlying Portage and Chemung, appear at Kettle Point, on Lake Huron, and in portions of the region southward to Lake Erie; but the oil wells sunk in Enniskillen show that the source of the oil is really below the horizon of these shales, inasmuch as the underlying argillaceous shales and limestones of the Hamilton group are there found near the surface, and have been penetrated 120 feet, at which depth oil is still met with, leaving but little doubt that it is derived from the limestones beneath, which, both in New York and in Canada, are impregnated with petroleum. A somewhat slaty, brownish-black, bituminous dolomite, belonging to the Corniferous limestone from Pine Creek, near Alma, in Kincardine, gave me not less than 12·8 per cent. of bitumen, fusible and readily soluble in benzole, and another from the Grand Manitoulin Island, which was a brown, crystalline dolomite, yielded from 7·4 to 8·8 per cent. of similar bitumen. The solid form of this bitumen at the outcrop of the rocks is probably due to the action of the air.

The existence of liquid bitumen in the Corniferous limestone in Western Canada was pointed out as long ago as 1844 by Mr. Murray, who tells us that this rock is generally bituminous, and that cavities in it are often filled with petroleum; the quarries near Gravelly Bay, in Wainfleet, are cited as an example (Report of Geol. Survey, 1846, p. 87.) In the report of 1850 we find a notice of what are called oil springs, in which petroleum rises to the surface of the water near the right bank of the Thames, in Mosa, and in two places in Bear Creek, in Enniskillen. Subsequently Mr. Murray described a considerable deposit of solid bitumen or mineral tar, which occurs in the same township, extending over about half an acre, and in some places two feet in thickness, doubtlesss formed by the drying up of petroleum springs (Report for 1851, p. 90.) I had already, in the Report for 1849, p. 99, described this bitumen from specimens in the Museum of the Geological Survey, and called attention to its economic applications, remarking that "the consumption of this material in England and on the Continent for the construction of pavements, for paying the bottom of ships, and for the manufacture of illuminating gas, is such that the existence of these deposits in the country is a matter of considerable importance." At this time solid bitumen was thus employed, but in the liquid form of petroleum its use was chiefly confined in Europe to medicinal purposes. Under the names of Seneca oil and Barbadoes tar it had long been known and employed medicinally by the native tribes of America. Its use for burning, as a source of light or heat, in modern times has been chiefly confined to Persia and other parts of Asia, although in former ages the wells of the island of Zante, described by Herodotus, furnished large quantities of it to the Grecian Archipelago, and Pliny and Dioscorides describe the petroleum of Agrigentum, in Sicily, which was used in lamps under the name of Sicilian oil. The value of the naphtha annually obtained from the springs at Bakoum, in Persia, on the Caspian sea, was some years ago estimated by Abich at about 600,000 dollars, and the petroleum wells of Rangoon, in Burmah, are said to furnish not less than 400,000 hogsheads yearly. In the last century the petroleum or naphtha obtained from springs in the Duchy of Parma was employed for lighting the

streets of Genoa and Amiano; but the thickness, coarseness, and unpleasant odor of the petroleum from most sources were such that it had long fallen into disuse in Europe, when in 1847 the attention of Mr. Young, a manufacturing chemist of Glasgow, was called to the petroleum which had been thus obtained in considerable quantities from a coal mine at Riddings, in Derbyshire, from which, by certain refining processes, he succeeded in preparing a good lubricating oil. This source, however, soon becoming exhausted, he turned his attention to the somewhat similar oils which Reichenbach and Selligue had long before showed might be economically obtained by the distillation of coal, lignite, peat, and pyroschists. To this new industry Mr. Young gave a great impetus, and in connection with it attention was again turned to the refining of liquid and solid bitumens, it being found that the latter by distillation gave great quantities of oil identical with those from petroleum. About the year 1853 the attention of speculators was turned to the deposits of bitumen in Enniskillen just described, but it was not till 1857 that Mr. W. M. Williams, of Hamilton, with some associates, undertook the distillation of this tarry bitumen, when they soon found that by sinking wells in the clay beneath it was possible to obtain great quantities of the material in a fluid state. Large numbers of wells were subsequently sunk by Mr. Williams and others in the southern part of the township of Enniskillen, along the borders of the Black Creek, and also about ten miles farther north on Bear Creek. Nearly 100 wells had been sunk when I visited the place in December last, and many more have since been bored. Of these but a small proportion furnish available quantities of oil, but the whole amount already obtained from the district is perhaps not less than 300,000 or 400,000 gallons. Owing to the difficulties of communication and of procuring casks sufficient for the oil, these wells have not been wrought in a continuous manner. Large quantities of oil are, however, taken out at intervals of some days, and it is probable that, if continuously worked, the supply would be still greater. Here, as in Pennsylvania, considerable variations are found in the quality of the oil. That from the wells on Black Creek is more liquid and less dense than the oil from Kelly's wells on Bear Creek, and it is said that wells recently sunk to a

considerable depth in the rock have yielded an oil still thinner, lighter colored, and less dense, which is prized as being more profitable for refining. The present wholesale price of the crude oil from Kelly's wells, delivered at Wyoming station on the Grand Trunk Railway, is about thirteen cents a gallon. The oil obtained by Mr. Williams is refined in Hamilton, while that from the northern part of the township has hitherto been sent to Boston, though refining works are now being erected at the wells. The process of refining consists in rectifying by repeated distillations, by which the oil is separated into a heavier part employed for lubricating machinery, and a lighter oil, which, after being purified and deodorised by a peculiar treatment with sulphuric acid, is fit for burning in lamps.

These wells occur along the line of a low, broad anticlinal axis, which runs nearly east and west through the Western Peninsula of Canada, and brings to the surface in Enniskillen the shales and limestones of the Hamilton group, which are there covered with a few feet of clay. The oil doubtless rises from the Corniferous limestone, which, as we have seen, contains petroleum. This being lighter than the water which permeates at the same time the porous strata, rises to the higher portion of the formation, which is the crest of the anticlinal axis, where the petroleum of a considerable area accumulates, and slowly finds its way to the surface through vertical fissures in the overlying Hamilton shales, giving rise to the oil springs of the region. The oil is met with at various depths. In some cases an abundant supply is obtained at forty feet, while near by it is only met with at three or four times that depth, and sometimes only in small quantities. Everything points to the existence of separate fissures communicating with a deep-seated source. At Kelly's wells, however, it would appear that a reservoir has been formed much nearer the surface, where in a bed of gravel and boulders, underlying the superficial clays, the oil rising from the rocks beneath has accumulated. The inflammable gas which issues from the wells is not necessarily connected with the petroleum, inasmuch as it is an almost constant product of the decomposition of organic matters, and is copiously evolved from rocks which are destitute of bitumen. It is similar to the gas of marshes and to the fire-damp of coal

mines. A curious circumstance is, however, noticed by Mr. Robb; the gas which accumulates in the oil pits becomes charged with vapors which produces upon the workmen a sort of intoxication like nitrous oxide. This is not surprising when we remember that volatile hydrocarbons, like amylene, closely related to the hydrocarbons of petroleum, produce similar effects when their vapor is respired.

The oil wells of the United States are for the most part sunk in the sandstones which form the summit of the Devonian series; but the oils of Western Virginia and Southern Ohio rise through the coal measures which overlie the Devonian strata, while the wells of Enniskillen are situated much lower, and are sunk in the Hamilton shales, which immediately overlie the Corniferous or Devonian limestone. It is not impossible that in Ohio some of the higher strata, such as the sandstone, were originally impregnated with bitumen, but in Canada, from the absence of this substance diffused through the shales in question, we are forced to assign it to a lower horizon, which is doubtless that of the bituminous Devonian limestone. This view I have for some time maintained in opposition to those who conceive the bitumen to be derived from the black pyroschists; (see my lecture before the Board of Arts reported in the *Montreal Gazette* of March 1, where I asserted that the source of the petroleum was to be sought in the bituminous Devonian and Silurian limestones;) besides the Corniferous limestone (Devonion,) we have shown that both the Niagara and the Trenton (of Upper and Lower Silurian age) contain petroleum. The question of the extent of the supply of petroleum is not easily answered; the oil now being wrought is the accumulated drainings of ages, concentrated along certain lines of elevation, and the experience of other regions has shown that these sources are sooner or later exhausted; but though the springs of Agrigentum, like those of Derbyshire, have nearly ceased to flow, those of Burmah and Persia still furnish, as they have for ages past, immense quantities of oil, nothing but experience can tell us the richness of the subterranean reservoirs. It is not probable that the Devonian limestone is equally rich in petroleum throughout its whole distribution, but the exposures of it in the west are too few to enable us as yet to say in what portions the petroleum predomi-

nates; as, however, this rock underlies more than one-half of the Western Peninsula, we may look for the petroleum springs much further east than Enniskillen. A well yielding considerable quantities of petroleum is said to occur in the township of Dereham, about a quarter of a mile southwest of Tilsonburg, and we may reasonably expect to find others along the line of the anticlinal, or of the folds which are subordinate to it.

It is now many years since Sir William Logan described the occurrence of petroleum springs in Gaspé, and collected specimens of the oil, which are preserved in the Geological Museum. One of these, near Gaspé Bay, is described as occurring on the south side of the St. John's River, about a mile and a-half above Douglas Town, where it may be collected by digging pits in the mud on the beach. Another locality is about 200 yards up a small fork of the Silver Brook, which falls into the south-west arm six or seven miles above Gaspé Basin. The oil collects in pools along the stream, and may be gathered in considerable quantities. The cavities in a greenstone dyke on Gaspé Bay were also found to be filled with petroleum, and the odor of it from the rock was perceived at a considerable distance. The dyke, which marks a fold in the stratification, runs in the direction of the petroleum springs, and the evidences of the distribution of petroleum are thus, as Sir William Logan has remarked, visible along a line of twenty miles (Report for 1844, p. 41.) Attention has recently been drawn to these indications, and a company formed with a view of exploring this region for petroleum. Here, as well as in Western Canada and the United States, the connection is evident between the springs and undulations of the strata which favor the accumulation of the petroleum.

We have stated in the preceding paper that the different mineral combustibles have been derived from the transformations of vegetable matters, or in some cases of animal tissues analogous to these in composition. The composition of woody fibre or cellulose, in its purest state, may be represented by $C_{24}H_{20}O_{20}$, or as a compound of the elements of water with carbon; the incrusting matter of vegetable cells, to which the name of lignin has been given, contains, however, a less proportion of

oxygen, and more carbon and hydrogen than cellulose, so that the mean composition of recent woods, as deduced from numerous analyses of various kinds, may be represented by C_{24} $H_{18\cdot4}$ $O_{16\cdot4}$. We may conceive of four different modes of transformation of woody fibre, all of which probably intervene to a greater or less degree in the production of mineral combustibles; and in considering these changes we shall for greater simplicity adopt for the composition of woody fibre, the first named formula, $C_{24}H_{20}O_{20}$.

I. When wood is exposed to the action of moist air, oxygen is absorbed, and carbonic acid and water are evolved in the proportion of one equivalent of the first for two of the last.

We may suppose that for H_2 which is oxidised by O_2 from the air, the wood loses CO_2, so while the carbon increases in amount the proportions of oxygen and hydrogen are unchanged. In this way an equivalent of cellulose, by absorbing sixteen equivalents of oxygen, and losing eight of carbonic acid ($8CO_2$,) and sixteen of water (16HO,) would leave $C_{16}H_4O_4$. Such is the nature of the decay of wood when exposed to the air, and the process, could it be carried out, would leave a residue of carbon only. If, however, the wood is deeply buried and excluded from the oxygen of the air, two reactions are conceivable.

II. The whole of the oxygen of the wood may be given off in the form of carbonic acid, while the hydrogen remains with the residual carbon. The abstraction of ten equivalents of carbonic acid from one of woody fibre would leave a hydrocarbon C_{14} H_{20}.

III. Instead of combining exclusively with the carbon, a part of the oxygen of the wood may be set free as water, in combination of the hydrogen. The abstraction from an equivalent of woody fibre of four equivalents of carbonic acid and twelve of water would leave a hydrocarbon $C_{20}H_8$.

IV. These decompositions are, however, never so simple as we have supposed in II. and III., for a portion of hydrogen is at the same time evolved in combination with carbon, chiefly as marsh-gas, C_2H_4. The amount of this gas evolved from decaying plants submerged in water, and the immense quantities of it condensed in coal-beds and other rocky strata (forming fire-damp,) show the great extent to which this mode of decomposition prevails.

In nature these various modes of decomposition often go on together, or intervene at different stages in the decomposition of the same mass; they are, besides, seldom so complete as we have represented them. The first process results in the formation of vegetable mould, which always retains portions of carbon and hydrogen; while the incomplete operation of the processes II., III. and IV. give rise, to peat, lignite, brown coal, bituminous coal, and pyroschists, in all of which the proportion of the oxygen is much less than the hydrogen, so that their composition may be approximately represented by mixtures of hydrocarbons with vegetable fibre. The following results have been selected from a great number of analyses by various chemists, and are for the most part taken from Bischof's "Chemical Geology" (vol. i. cap. xv.) The nitrogen, which in most cases was included in the oxygen with the analysis, has been disregarded, and the oxygen and hydrogen, for the sake of comparison, have been calculated for twenty-four equivalents of carbon :—

1.	Vegetable fibre or cellulose	$C_{24}H_{20}O_{20}$
2.	Wood, mean composition	$C_{24}H_{18\cdot4}O_{16\cdot4}$
3.	Peat (Vaux)	$C_{24}H_{14\cdot4}O_{10}$
4.	Ditto (Regnault)	$C_{24}H_{14\cdot4}O_{9\cdot6}$
5.	Brown coal (Schrötter)	$C_{24}H_{14\cdot3}O_{10\cdot6}$
6.	Ditto do. (Woskresensky)	$C_{24}H_{13}O_{7\cdot6}$
7.	Lignite (Vaux)	$C_{24}H_{11\cdot3}O_{6\cdot4}$
8.	Do., passing into mineral resin (Regnault)	$C_{74}H_{15}O_{3\cdot3}$
9.	Bituminous coal ditto	$C_{24}H_{10}O_{3\cdot3}$
10.	Ditto do. ditto	$C_{24}H_{10}O_{1\cdot7}$
11.	Ditto do. ditto	$C_{24}H_{8\cdot4}O_{1\cdot2}$
12.	Ditto do. ditto	$C_{24}H_{8}O_{0\cdot9}$
13.	Ditto do. (Kühnert and Gräger)	$C_{24}H_{7\cdot4}O_{1\cdot3}$
14.	Ditto do. (mean comp.) (Johnston	$C_{24}H_{9}O_{2}-O_{4}$
15.	Albert coal (Wetherell)	$C_{24}H_{15\cdot9}O_{1\cdot6}$
16.	Asphalt, Auvergne	$C_{24}H_{17\cdot7}O_{2\cdot2}$
17.	Ditto, Naples.	$C_{24}H_{14\cdot6}O_{2}$
18.	Ditto, Bastennes	$C_{24}H_{16}O_{0\cdot7}$
19.	Elastic bitumen, Derbyshire (Johnston)	$C_{24}H_{22}O_{0\cdot3}$
20.	Bitumen of Idria	$C_{24}H_{8}$
21.	Petroleum and naphtha	$C_{24}H_{24}$

In the above table we see the transition from peat and brown coal to lignite, and thence to bituminous coal. Professor Johnston, from his experiments on various coals, including cannel from Wigan, splint coal from Workington, and caking coal from Newcastle, deduced the composition given in 14, in which with C_{24} H_9 the oxygen varies from two to four equivalents. It will be seen from a comparison of the infusible Albert coal with the bitumens 16, 17, and 18, how gradual is the transition to the true petroleums and naphthas, from which oxygen is absent. The asphalts also, as will be observed, differ very much in their composition, and though generally much richer in hydrogen than the bituminous coals, the variety from Naples (17) which is completely fusible at 140° C., contains less hydrogen and more oxygen than the Albert coal analysed by Wetherell; while the idrialine or bitumen found with the mercury ores of Idria, approaches very nearly in composition to the bituminous coals, 11, 12, and 13, with which many asphalts may be said to be isomeric. It is, however, probable that those oxygenised bitumens, unlike the coals, are products of the oxidation of naptha or petroleum, by a process similar to that by which resins are derived from vegetable hydrocarbons. These formulæ must be taken as representing not the true equivalents, but only the proportions of the elements in the bodies in question, which are in most cases mixtures of various substances. This is especially true of naphtha, which may be taken as the representative of pure unoxidised petroleum, and which is separated by distillation into oils of very different boiling points. The late analyses by Uelsmann of the rectified rock oil from Sehnde, near Hanover, gave the formula $C_{18}H_{20}$ and, according to De la Rue and Müller, the greater part of the Rangoon petroleum consists of hydrocarbons, in which the number of equivalents of hydrogen is a little greater than the carbon; one gave $C_{26}H_{28}$. Associated with these are, however, portions of bodies containing a less proportion of hydrogen, so that we may conceive the mean composition of petroleum to be represented, as in the preceding table, by equal equivalents of hydrogen and carbon; many forms of solid bitumen also, as ozokerite and hatchetine, have the same general composition.

By referring to what has been said above, it will be seen that

the final result of the third process of decomposition of woody fibre, in which the air being excluded the oxygen is shared between the carbon and hydrogen, would be $C_{20}H_8$. A similar result would be obtained with the simultaneous evolution of marsh-gas, if we suppose 6 $CO_2+8HO+3CH_2$ to be removed from an equivalent of woody fibre, leaving $C_{15}H_6 = C_{20}H_8 = C_{24}H_{9.5}$, which approaches the composition of most bituminous coals and of idrialine. A further elimination of marsh-gas would leave a residue of pure carbon, and thus, as Bischof has suggested, vegetable matters may be converted into anthracite without the intervention of a high temperature.

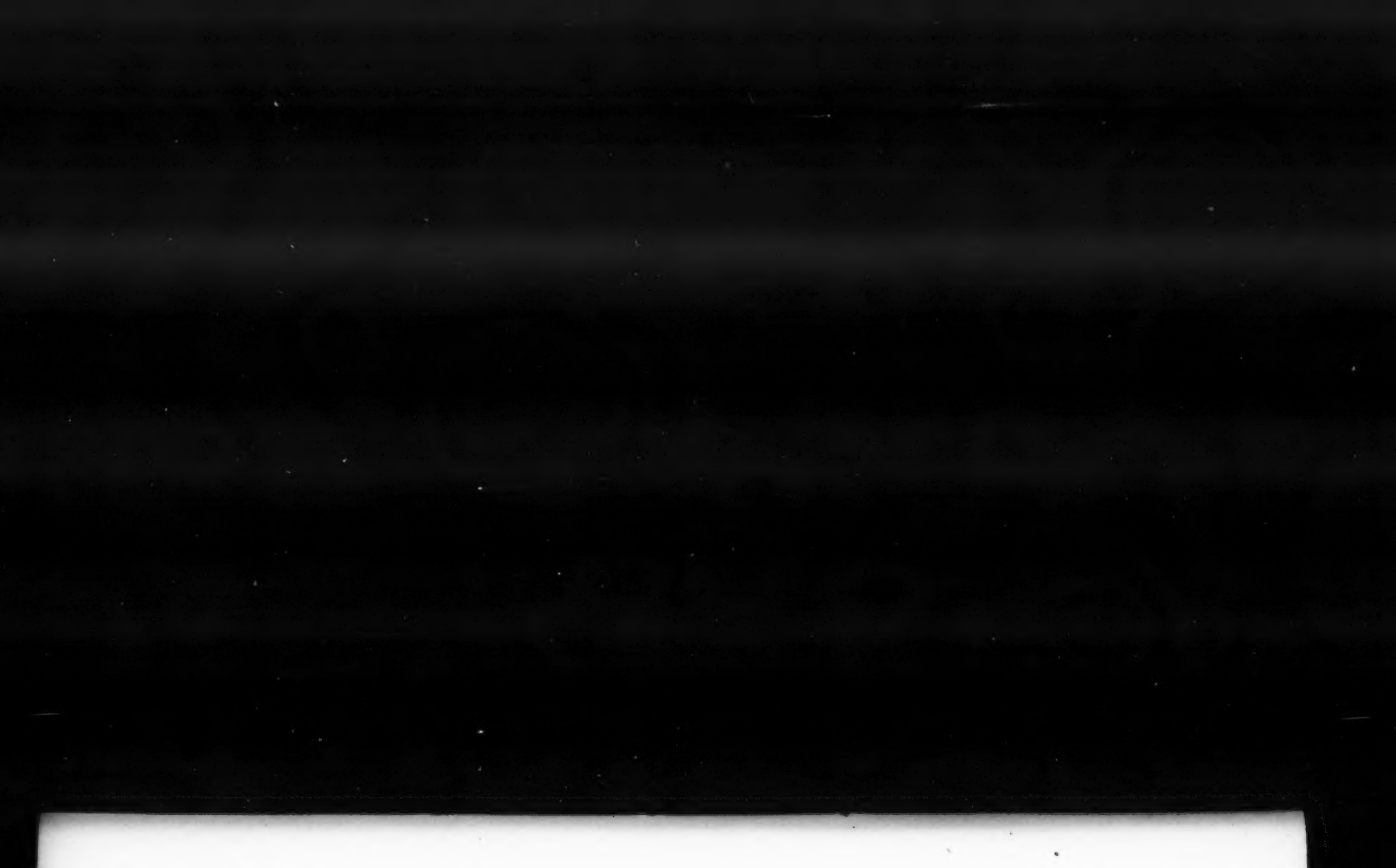
The elimination of the whole of the oxygen in the form of carbonic acid would leave a compound with a large excess of hydrogen, of which it would be necessary to remove a portion in the form of water or marsh-gas, in order to reduce the residue to the composition of petroleum. We know of no combination of carbon and hydrogen in which the number of atoms of hydrogen surpasses by more than two, those of hydrogen, the general formula being $CnHn+_2$, so that oils like $C_{18}H_{20}$ and $C_{26}H_{28}$ contain nearly the maximum quantity of hydrogen, and a body like $C_{14}H_{20}$, whose formation we have supposed above, could not exist, but must break up into marsh-gas and some less hydrogenous oil like petroleum.

We do not know the precise conditions which in certain strata favor the production of petroleum rather than of lignite or coal; but in the fermentation of sugar, to which we may compare the transformations of woody fibre, we find that under different conditions it may yield either alcohol and carbonic acid, or butyric and carbonic acids with hydrogen, and even in certain modified fermentations the acetic, lactic, and propionic acids, and the higher alcohols, like $C_{10}H_{12}O_2$. These analogies furnish suggestions which may lead to a satisfactory explanation of the peculiar transformation by which, in certain sedimentary strata, organic matters have been converted into bitumen.—*Chem. News, July 5th, 12th and 19th, from the Canadian Naturalist.*

PRODUCTION OF CORK.

In the "Mémoires de la Société de Physique" of Geneva, is an interesting paper by M. Casimir de Candolle on the growth

of cork. Although this useful substance exists in varying quantity in the bark of all phanerogamous plants and in several cryptogamous, yet for commercial purposes it is wholly procured from two species of oak, *Quercus occidentalis*, growing in the south-west of France and in Portugal, and from *Quercus Suber* (the cork-tree,) growing in the south-east of France, in Italy, in Algeria, and in the isles of the Mediterranean. The acorns of the former species take two years to ripen. In 1859 M. C. de Candolle, while staying in Algeria, studied the developement of the bark of the latter species. It is composed of four layers—the epidermis, the corky envelope, the cellular envelope, and the liber which covers the soft wood. These four parts increase independently of each other year by year. In the third or fourth year the epidermis, having attained the limits of its elasticity, splits longitudinally, and a marked change takes place in the corky envelope, which gradually takes up the appearance of true cork: new layers are produced, and the transformation of cellulose into cork steadily goes on. The cork thus naturally developed has no commercial value. It is termed "male;" and the first act (*démasclage*) of the cultivator is to separate it from the trunk, which thus leaves exposed the liber, termed "mother." The tree is then left to itself, and the cork begins to grow again, whilst the sap is flowing in consequence of the exposure of the liber. If a trunk left in this state for several months be cut down, in the section a ring of cork will be found formed in the interior of the "mother," at a variable distance from the surface of the trunk All the exterior portion of the "mother" is dead, and splits as the tree grows, and the interior portion (new cork, termed "female") is developed. This "female" cork grows in the same manner as the "male," that is, by the addition of annual layers on the internal surface; but it is much finer and more elastic, and is the cork of commerce. These various stages of growth are exhibited in a series of beautiful plates. In the course of his researches M. de Candolle was led to observe the importance of the desiccation of the "mother," and to infer that, in proportion as this desiccation could be hastened, so much sooner would fresh layers of cork be produced. This idea he found to be correct. He observed several trees in which



fires, after having charred the male or female cork, had determined the formation of a layer of female cork in the interior of the "mother." He states that he has seen a specimen, composed of three layers of "female" cork, separated by little zones from the "mother;" the fourth layer, which enveloped the whole, having disappeared in consequence of the fire. The thickness of these zones, increased by the application of boiling water, does not diminish by cooling. Other peculiarities of this remarkable substance are noted in the memoir.—*The Chemist and Druggist, August* 15, 1862.

ON NATIVE ZINC AND NATIVE TIN.

By Dr. T. L. Phipson, F.C.S., &c.

Having been requested to give a description of the Australian minerals exhibited by the various Australian Colonies in the International Exhibition, I was surprised to find in this magnificent collection a specimen of native zinc. This is the first time that this metal has been met with in nature in the pure state. The specimen, weighing perhaps ten or twelve grains, is incrusted in a piece of basalt, from Brunswick, near Melbourne, Victoria.

Concerning native tin, it is evidently very rare in nature. Some years ago, I noticed some small white grains in a sample of platinum ore from the Ural, which appeared to be metallic tin. Hermann had already met with this metal, in small white grains, in the gold deposits of Siberia, and, recently, M. Damour found it accompanying some gold nuggets from Guyana. These nuggets contained nearly 42 per cent. of platinum, also silver and copper. One of them was observed to have adhering to its surface, and in some of its cavities, a grayish-white ductile metal which was proved to be metallic tin.

The above leads me to infer that the supposed new element noticed in the platinum ore of Rogue River, Oregon, by Mr. Chandler, and in the platinum ore of California, by Dr. Genth, as stated in a recent number of the *Chemical News*, is simply metallic tin. The more so, as these authors state that the metal in question is malleable, easily fusible, soluble in hydrochloric acid, from which solution it is precipitated as a brown sulphide

by sulphuretted hydrogen, or by zinc as a metal resembling metallic tin.—*Chem. News, London, July* 26, 1862.

ON A METHOD OF PREPARING CERTAIN PHARMACEUTICAL EXTRACTS.

By M. Pierlot.

M. Pierlot's process is especially valuable in preparing extracts of aromatic plants, their useful principles being necessarily dissipated during the preparation of extracts by the ordinary method. It might pass for an ingenious application of M. Millon's researches on the subject of vegetable perfumes if the author, who does not quote M. Millon, did not appear to be unaware of his work.

Into a displacement apparatus, a fresh plant, such as absinthe, tansy, milfoil, chamomile, primrose root, valerian root, &c., is introduced, and covered with ether, which gradually expels the water of vegetation, and retains the volatile aromatic principles of the plant. The displaced water occupies the lower part of the funnel, holding in solution the extractive matter, the albumen, and several saline principles. In proportion as it is drawn off, the water is replaced by fresh quantities of ether, and as soon as the ether ceases to displace water the plant is put under the press, and treated again by ether.

The different quantities of ether which have been used are now to be mixed, and distilled in a water bath at 30°. This distillation produces ether, with hardly any impregnation, and a residuary (formed of an essential oil, of a bluish color, and a greenish-yellow, resinous, fatty matter) containing all the perfume of the plant.

The displaced water contains the extractive matter and the albumen. By shaking up with a little alcoholised ether, the coagulated albumen rises to the surface, and is separated by filtration. The extractive matter is obtained by evaporation.

The union of these two residuums gives an odorous extract, representing very exactly all the active elements of the plant. Pharmaceutists who attach an exaggerated amount of importance to the appearance of their medicaments can object to it only on account of its forming with water turbid solutions.

M. Pierlot says that all the fresh flowers and roots he has treated in this way have yielded almost identical quantities of extract,—about ten per cent., two parts of aromatic principles, and eight parts of extractive. He adds:—"It is useless to enlarge on the therapeutical and pharmaceutical advantages of this method of preparing extracts of aromatic plants. I will only remark that, from a pharmaceutical point of view, the process forms the commencement of analysis,—that is to say, the estimation of these medicaments. The word 'commencement' is a necessary correction; for now-a-days it is not sufficient in analysing a plant to determine the amount of extract it will yield."—*Chem. News*, *July* 16, 1862, *from Bulletin de Thérapeutique*, vol. lxi. p. 409.

MINOR NOTES ON THE MATERIA MEDICA OF THE INTERNATIONAL EXHIBITION.

By Daniel Hanbury, f. r. s.

Contrayerva Root.—It has long been known to pharmacologists that this drug, as found in the shops, is not derived from *Dorstenia Contrajerva*, Linn., but that it is usually the root of another species, *D. Brasiliensis* Lam. The Exhibition, however, contains two specimens of contrayerva root which are ascribed, and, I have no doubt, correctly, to *D. Contrajerva*. One of them has been forwarded by M. Bélanger, of the Botanical Garden of St. Peirre, Martinique, the other by Mr. Devenish, of Trinidad. Dr. Crüger, the Colonial Botanist of Trinidad, states that the drug is in great repute among the Spaniards of the island as an alexiteric. Contrayerva root has become nearly obsolete in European medical practice, and, indeed, almost of necessity, for it is very scarce, and the little that can be found is usually old and worm-eaten. Were it necessary to re-introduce it, supplies could be obtained from Trinidad, in certain localities of which island, I am informed by Dr. Crüger, *D. Contrajerva* is abundant.

Pods of Myrospermum.—The Trinidad collection of drugs contains a good specimen of the entire legumes of *Myrospermum frutescens* Jacq., a tree known in the island by the name of *Guatamare*. These legumes are a very popular stomachic

and carminative, and are also used externally in the form of tincture, for pains, etc. The tree which in Trinidad attains an altitude of sixty to one hundred feet (and hence bears a very improper specific name,) yields from incisions in its stem a small amount of balsamic resin which hardens in the air and is then undistinguishable from Balsam of Tolu. None of this resin is collected in Trinidad, where the tree is not very abundant and apparently not indigenous. Young plants of *M. frutescens*, raised from seeds sent by Dr. Crüger, may be seen in the Royal Gardens of Kew.

Pods of *Myrospermum*, having the posterior or winged portion broken off, are also sent to the Exhibition from Venezuela. No information accompanies them, except that they are called *Sereipa*, and are from the province of Guayana. Careful inspection shows that they are the produce of two species, the smaller pods being apparently those of *M. frutescens* Jacq., and the larger those of some other species which I cannot identify.

MANNA.—Very few pharmacologists having seen any other form of this drug than that derived from the Manna ash (*Fraxinus Ornus* L.), it is peculiarly interesting to find among the Materia Medica of the Exhibition at least four other kinds of manna, namely the following:—

1. *Manna of the Oak.*—Mr. H. S. Maltass, of Smyrna, has sent, together with various other interesting drugs, a saccharine substance called *Diarbekir Manna*, respecting which he has given me the following information, upon the authority of a relative who resided for two years in Diarbekir. The manna is found upon the leaves of the dwarf oaks, from which it is collected by the peasants, who use it instead of butter in cooking their food, and ascribe to it no purgative properties, at least while it is fresh. The manna is deposited upon trees much more copiously after misty weather than at any other period. The sample of oak-manna in the Exhibition constitutes a moist but solid mass of agglutinated tears, closely resembling some of the common qualities of ash-manna. Its taste is simply saccharine, and agreeable.

2. *Eucalyptus Manna.*—There are several specimens in the Exhibition of this substance, which is found in the form of small rounded opaque-white masses upon the leaves and younger

branches of *Eucalyptus viminalis* La Bill. The exudation, which is said to result from the punctures of insects, takes place most copiously in the early part of summer, at which time the manna appears as a translucent liquid, resembling thin honey, and gradually solidifies. This Australian manna has not hitherto been collected for medicinal purposes.

3. *Australian Insect-Manna* called *Lerp.*—Having only recently obtained a specimen of this substance which to me was previously unknown, I am unable to offer much information respecting it. According to the *Victorian Exhibition Report* published at Melbourne this year, we find that the leaves of *Eucalyptus dumosa* Cunn., called by the colonists *Mallee Scrub*, becomes coated at certain seasons of the year with an opaque white saccharine substance in such profusion, that the shrubby vegetation has the appearance of being *iced*. This substance, which among the aborigines of the northern districts of the colony obtains the name of *lerp*, is the secretion of an insect of the *Psylla* family, and consists (judging from the specimen in my possession) of a series of depressed hemispherical cells, each from a tenth to a sixth of an inch in diameter, placed contiguous to each other, and adhering together so as to form irregular flakes, sometimes an inch or more across. These cells are composed of a semitransparent, colorless, or yellowish substance, which is somewhat smooth in their interior, but which on their external surface forms transparent woolly filaments, so closely interwoven that the outer surface of a flake shows no evidence of the cellular structure beneath. Each cell is the habitat of an insect, which when fully developed, escapes by boring a passage through the top of the cell to the outer air.

The *Lerp* manna has an odor resembling manna of the ash, a similar color and the same clammy feeling to the touch; it has a saccharine taste, but does not dissolve in the mouth. It is not wholly soluble in cold water or in cold alcohol; boiled in water, it breaks down so as to form a turbid mucilaginous liquid, which is colored intensely blue upon the addition of iodine. Like the Australian manna previously noticed, the Lerp manna has not at present any useful application.

4. *Alhagi Manna* has been sent to the Exhibition from India. It is a saccharine substance in small, loose, dry grains

of a pale brown color, mixed with both leaves and pods of *Alhagi* (? *Mauvorum* Tourn.) It therefore differs in appearance from the Syrian alhagi-manna, sent by Dr. Gaillardot, of Saida, to M. Léon Soubeiran, which the latter describes as compressed into loaves or cakes.

CINCHONA BARK.—Neither Peru, Bolivia, Ecuador, nor New Granada have contributed any series of the Cinchona barks which are produced in their forests. There is, however, a fine general collection exhibited by Messrs. Howard and Sons, of London, and illustrated by drawings of the plants as well as by healthy living specimens of *Cinchona succirubra* Pav., *C. micrantha* R. et P., *C. Uratusinga* Pav., *C. nitida* R. et P., and *C. peruviana* Howard. Among the productions of the Dutch colonies are specimens of genuine Calisaya bark grown in Java, also of the bark of *C. Pahudiana* Howard, a species of very little medicinal value.

BALSAM OF COPAIBA.—The specimen sent from Trinidad is interesting as being entirely produced by one species, namely *Copaifera officinalis* Jacq., a tree abundant on the south coast of the island. Balsam of copaiba is not at present, I believe, an article of export from Trinidad.

SEEDS OF SCAPHIUM: BOA-TAM-PAIJANG.—In a recent number of the "Pharmaceutical Journal," I described and figured under the Chinese name *Ta-hai-tsze*, a drug which some years ago had an ephemeral reputation in Paris as a specific in diarrhœa and dysentery. From its resemblance to the fruits of certain species of *Erioglossum* and *Nephelium*, I conjectured it might belong to one of those genera, or at least to the Order *Sapindaceæ*. In May last, however, M. Decaisne requested me to examine whether it was not rather the *seed* of *Scaphium*, a genus of *Sterculiaceæ*, in which the follicles enclosing the seeds are monospermous, very large and leaf-like, and open long before the seed attains maturity. The correctness of M. Decaisne's opinion was soon confirmed by specimens of *Scaphium scaphigerum* Wall., contained in the herbarium of the Royal Gardens of Kew, and in that of the Linnean Society, and no doubt remained that the seed of that plant constitutes the drug called *Ta-hai-tsze* by the Chinese, and *Boa-tam-paijang*

and *Bung-telai* by the Siamese. The French collection of products from Cochin China includes a specimen of it, which in the catalogue is referred doubtfully to *Sterculia* (*Scaphium*) *scaphigera;* it is stated, though probably in error, to be used in dyeing. It is also sent to the Exhibition from Siam.

RADIX BEHEN.—This drug which held an important place in the medical writings of the Arab school, and which thence became introduced into most of the Pharmacopœias of Europe up to the commencement of the last century, was recently the subject of an interesting communication to the "Journal de Pharmacie et de Chimie," by Professor Guibourt, of Paris. There are two sorts of Behen, the *white* and the *red*, both of which have long been obsolete in Europe, though still found in the bazaars of the north-west of India, whence specimens have been sent to the Exhibition. White Behen is referred by all writers on materia medica to *Centaurea Behen* L., a plant of Persia and traditionally also of the Lebanon. Red Behen is generally attributed to *Statice Limonium* L., but the root of this plant, whether produced in Europe or in Asia, is so very different that I cannot suppose there is the least connection between it and the drug in question.

AMOMUM FRUITS.—The Exhibition contains the fruits of several species which are not without interest to the pharmacologist. Thus we find fruits of *Amomum cardamomum* L., and *A. xanthoides* Wall., sent from Siam and Cochin China; and fruits of *A. maximum* Roxb. from India. From the French settlements of the Gaboon River, come specimens of the fruits of *Amomum citratum* Pereira, a species of which we at present know very little, but which is remarkable for the agreeable lemon-like odor of its large angular seeds. The fruit of *A. Danielli* Hook. f., a very variable plant, common all along the coast of tropical Western Africa, is in one of the English collections, where we also find fruits of *A. latifolium* Afz., which are striking from their large size. *A. latifolium*, a native of Sierra Leone, was described by Afzelius in 1813 in his "Remedia Guineensia," published at Upsal, but it is a plant still almost unknown to botanists. There are specimens of two other fruits of *Amomum* from the Portuguese settlements on the west coast, which probably belong to undescribed species.

Fruits of *Amomum Melegueta* Rosc., the seeds of which constitute the *Grains of Paradise* of the shops, are sent from the West Indies, where the plant, which has been introduced from Western Africa, thrives as well as in its native jungles. Lastly I may name as the most interesting of all, *Amomum Korarima* Pereira, the fruits of which have for ages been known as the *Greater Cardamom* (*Cardamomum majus*) though the name is now misapplied to Grains of Paradise. The true *Cardamomum majus*, which is figured and described in several of the older works on materia medica, is still an object of traffic in the East, and, strung upon strings, may still be seen adorning the stalls in the drug bazaar of Damascus. In Abyssinia it answers the purpose of small coin, and as such it figures in the collection exhibited by the International Decimal Association. The seeds of *A. Korarima* are an agreeable aromatic, in flavor much resembling the seeds of the common Elettaria Cardamom, and entirely devoid of the burning taste of Grains of Paradise. The plant for which the late Dr. Pereira proposed the name *Amomum Korarima* is entirely unknown; it is supposed to be a native of eastern Central Africa, whence its fruits are exported by way of Abyssinia and Massowah.

ROOT OF STATICE LATIFOLIA Sm.—Among the few drugs sent from Russia to the Exhibition, are specimens of the thick woody root of *Statice latifolia* Sm. (*St. coriaria* Pall.,) which is remarkable for its compact substance and large size, so unlike what is usual in other species of *Statice;* this root I have recognized to be identical with that imported some years ago into Marseilles, and described by M. Guibourt in his "Histoire des Drouges," tome 2, p. 416. With respect to its production and uses, I have been favored with the following remarks, by Mr. George Peterson, the Russian Commissioner of the Exhibition, who, as a member of the Scientific Committee for the Crown Lands of Russia, has the best opportunity for being correctly informed upon the subject. The "*Statice coriaria* of Pallas," says he, "grows wild in the whole prairie country of Southern Russia, known under the names of *steppes*, that is, land without forests. I have myself during two years travelled through this region, and seen roots of it of the length of more than thirty feet and with a top diameter of four and a half

inches. The plant is also found in the north of the Crimea and in the southern part of Bessarabia, but in general it is more common in the eastern part of the prairie region near the Wolga, and to the east of this river. To dig out the roots is very difficult, because the subsoil is hard and cannot be worked with a pickaxe. The root penetrates the soil and subsoil in a nearly perpendicular line; the longest roots are discovered on steep river banks, which are underwashed each spring-time by the swollen rivulets and also after heavy rains, the latter occurring very seldom. A small number of tanners have begun to employ the roots of *Statice*, but as the supply is precarious and the leather tanned with them brittle, no progress is made in utilizing this tanning material, which in more skilful hands has proved one of the best, as, for instance, in Spain."—*Lond. Pharm. Jour., Sept.*, 1862.

A NEW METHOD OF CLARIFYING SACCHARINE LIQUIDS, JUICES AND SYRUPS, AND OF REVIVIFYING THE ANIMAL CHARCOAL USED IN THE MANUFACTURE OF SUGAR.

By H. Leplay and J. Cusinier.

Of late years, most of the improvements in the manufacture of sugar have been directed to the disuse of animal charcoal. Having for many years witnessed the services which animal charcoal has rendered, and still renders, we have directed our researches in a direction entirely different. Our principal object has been to analyse the action exercised by animal charcoal on saccharine liquids at each stage of the manufacture, the duration of this action, and its exhaustion. We have sought to restore, by easy and speedy methods, the absorbing properties it loses by use, and to ascertain the cause of its various absorbing properties, on which chemistry hitherto has thrown but little light. This cause being discovered, we can, so to speak, increase it at will, and thus effect in saccharine liquids, juices, and syrups, a greater degree of purification than can be obtained by the ordinary means.

This study has led us to the discovery of a new method for refining saccharine liquids, and of revivifying animal charcoal,

as shown in the following principal results in the manufacture of beet-root sugar:

1. To completely do away with the use of fresh animal charcoal.

2. To abolish revivification at a high temperature (kilns for revivification, &c.)

3. To greatly reduce the quantity of charcoal used in the course of the work, and thus to effect a notable economy.

4. To obtain sugars of a superior quality, with a larger yield, without changing the apparatus now in use.

5. To reduce considerably the net cost of sugar.

Now, to point out this new method. In the ordinary manufacture, a filter filled with granulated charcoal lasts from twelve to twenty-four hours. The absorbing properties of the charcoal then appear to be exhausted, and have to undergo revivifying processes, the principal being calcination in a closed vessel at a high temperature. The animal charcoal thus revivified does not completely recover its primitive qualities, and its value as an absorbent is reduced one-half, and sometimes more.

In the ordinary method, all the absorbing properties of the animal charcoal are supposed to be exhausted at the same time, and the object of the revivifying process is to restore them equally and simultaneously.

The following is, on the contrary, the fundamental idea of our method:—

1. Granulated charcoal plays a manifold part, and has various absorbing powers, which act independently, and do not become exhausted simultaneously.

2. In the successive revivification of the absorbing properties of animal charcoal, according as they become exhausted, by various means appropriate to the nature of the matters the charcoal has absorbed.

3. In the possibility of augmenting at will the energy of the absorbing properties of the charcoal, and thus to render its refining action on juices and syrups more complete.

4. In obviating any necessity for a temperature higher than that of boiling water or free steam.

By investigating the process of the filtration of juices and syrups, we find that the exhaustion of the absorbing properties

of the charcoal can be divided into three periods, which we will examine successively.

The first series of absorbing properties is almost entirely exhausted after a few hours' filtering,—say, under ordinary circumstances, about four hours. These are the properties which affect viscous, nitrogenised, ammoniacal, sapid, and odorous matters, which injure the fluidity of syrups, their crystallization, the hardness and consistence of the grain, the quantity and quality of the sugar, and which impart to rough sugars the odor and flavor peculiar to the produce of the beet-root. We completely re-establish the primitive absorbing properties by passing a current of steam through the granulated animal charcoal contained in the filter. The absorbing properties of animal charcoal can thus be regenerated indefinitely.

A much longer time is required to exhaust the second series of absorbing properties. They last six or eight times as long as those of the first series. The period of exhaustion varies with the alkalinity of the defecated juices and syrups. Free alkalies, lime, potash, soda, salts of lime, and other saline matters are absorbed by the series in question. These matters especially contribute to color the juices and syrups during evaporation by destroying the sugar, and when present in large proportion prevent crystallization. We revive these absorbing properties by pouring a weak solution of hydrochloric acid over the charcoal contained in the filter and by sufficiently prolonged washings in water.

The third series comprise the absorptive properties of charcoal for coloring matters. They last thirty or forty times as long as the first series. Moreover, the presence of coloring matters in these syrups is of no great importance when they are transparent and brilliant and hold no matter in suspension. White sugars can be obtained from colored syrups, and when from the tint of the products, it is deemed necessary to revivify the power of absorbing coloring matters, we make use for this purpose of a weak solution of boiling caustic alkalies.

We use these various means of revivification either in the filter itself or in a special apparatus similar to the filter.

The various methods of revivification just described, restore the absorbing properties of the animal charcoal to their primi-

tive state, but without augmenting them. We have sought, in the production of a new fixed product in the charcoal itself, for the solution of the problem of augmenting the absorbing properties of charcoal.

When one equivalent of biphosphate of lime is added to one equivalent of tribasic phosphate of lime, identical with that which enters into the composition of animal charcoal, the two phosphates combine and form a third, which is a phosphate with two equivalents of base. This is explained by the following formula:

$$PO_5.3CaO + PO_5.CaO._2HO = 2(PO_5\,2CaO.HO.)$$

This new phosphate is insoluble in water, has no acid action on litmus paper, produces no inverting action on the sugar, and possesses very energetic absorbing properties.

What takes place in a test-glass with tribasic phosphate of lime is produced in the same manner in a filter filled with granulated animal charcoal when a weak solution of biphosphate of lime is poured over it. The same effect is produced with powdered animal charcoal. Charcoals treated in this way possess greater absorbing powers, which can be varied at will, and a smaller quantity of this charcoal suffices to produce a greater degree of refinement in juices and syrups.

Further, we have utilised for clarifying and purifying saccharine liquids the singular property possessed by the phosphate with three equivalents of lime, of precipitating itself in a gelatinous form, and of carrying with it all matters hindering the transparency of syrups, much more effectual than albumen, blood, and other matters used in clarification. In short, our processes are founded on attentive and inductive study of the singular and useful properties of different phosphates of lime, and of their application to the refinement of saccharine liquids, particularly beet-root juice and syrups.

The foregoing processes are in operation at two important sugar works in the department of the Oise,—one at Frauciéres, belonging to MM. Bachoux and Co.; the other at Frogers, belonging to MM. Daniel and Co. The quantity of sugar made at these two works by our processes is now about 300,000 kilogrammes. This manufacture has sufficiently shown the value of our processes and the reality of the advantages they

offer. Our processes can be applied with like success to the manufacture of cane sugar as well as sugar refining..—*Chem. News, May* 10, 1862.

ON LARIXINIC ACID, A CRYSTALLIZABLE VOLATILE PRINCIPLE FOUND IN THE BARK OF THE LARCH TREE (PINUS LARIX, LINN.)

By Dr. John Stenhouse, F.R.S.

The most convenient way of preparing this somewhat singular substance consists in cutting the bark of the larch into small pieces, and then digesting it in water for twenty-four hours, at a temperature of about 80° C. The solution, which has a deep reddish-brown color, is then poured off on to a second portion of larch bark, and digested as before. The concentrated infusion is then cautiously heated in an open porcelain dish, at the temperature of about 80° C., till it is converted into a syrup. A portion of this syrup is then distilled, either in glass or porcelain retorts, or, what is better than either, in a silver alembic. Iron retorts cannot be employed for this purpose, as the acetic acid, which is always produced during distillation, by forming acetate of iron, instantly destroys the larixinic acid, by changing it into a deep purple-colored liquid. When a silver alembic cannot be procured, a very convenient way of distilling the extract of the larch is to pour it into a large Florence flask, the neck of which is passed obliquely through a cork or bung, which is inserted into a glass condenser. When the flask is cautiously heated on a sand-bath, the larixinic acid comes over with the first portions of the liquid, but becomes more abundant as the distillation proceeds, and usually forms large flat crystals, which condense on the sides and neck of the receiver. The liquid which is distilled over, and which contains the greater portion of the larixinic acid, should be poured into small flat basins, and cautiously concentrated at about 60° C. When the greater portion of the water has been dissipated, it is advisable, especially in warm weather, to complete the operation by spontaneous evaporation; for unless the concentration of the aqueous solution of larixinic acid is conducted cautiously, the larixinic acid volatilises along

with the vapor of water, and is thereby lost. The highly concentrated solution of larixinic acid, obtained in the way just described, on standing, deposits brownish-yellow crystals, which are impure larixinic acid. This is to be pressed between folds of blotting paper, and again to be crystallized out of a small quantity of water. The larixinic acid may be rendered perfectly pure by subliming it once or twice. This is easily effected by placing the larixinic acid between two watch glasses, or in any other suitable apparatus, and heating it cautiously on a sand-bath, or even on a water-bath, as the larixinic acid sublimes at the very low temperature of 93° C. The larixinic acid is a proximate principle, which exists ready formed in the larch. This is easily proved by distilling even a dilute infusion of the bark, when the liquid which passes over will be found to strike a deep purple color with a persalt of iron, which is very persistent. The bark of old larch trees contains very little larixinic acid; but the bark of the small branches, and that of the stems of the larch, when not more than from twenty to thirty years of age, contains very considerable quantities of this substance, the concentrated syrup from the portions of bark yielding more larixinic acid than an equal weight of catechu does of oxyphenic acid. Larixinic acid, after it has been purified by sublimation, forms beautifully white crystals, often more than an inch in length, of a brilliant, silvery lustre, very much resembling benzoic acid in appearance. They sublime at 93° C., and melt at 153°; but its aqueous solutions volatilise at ordinary temperatures.

The smell of the aqueous solution of larixinic acid is sweetish, like that of a syrup, but the smell of the sublimed acid is very peculiar and slightly empyreumatic. As larixinic acid emits a sensible odor at ordinary temperatures, in this respect it considerably resembles naphthaline and ordinary camphor. The taste of larixinic acid is slightly bitter and astringent. It reddens litmus paper very slightly; but a single drop of potash or ammonia, when added to a solution of a large quantity of larixinic acid, renders it alkaline. Larixinic acid is very soluble in boiling water, but is by no means very soluble in cold water, 87·88 parts of water, at 15° C., dissolving one part of the acid only; but the solubility of larixinic acid in cold

aqueous solutions is greatly increased by the addition of either acids or alkalies. Larixinic acid is deposited from its aqueous solutions in crystals, which are very brittle, and often an inch or two in length. It likewise dissolves in cold alcohol, but to a much greater extent in hot alcohol. The crystals deposited from its alcoholic solutions are thicker and more distinctly formed than those from water. It also dissolves but sparingly in ether, and is deposited in crystals of very considerable lustre.* The following are the results of the analysis of the larixinic acid:—

I. 0·221 sublimed acid, dried *in vacuo*, gave 0·4633 carbonic acid, and 0·1003 water.

II. 0·1993 sublimed acid dried *in vacuo*, gave 0·417 carbonic acid, and 0·0913 water.

III. 0·2272 larixinic acid, crystallised out of water, gave 0·4756 carbonic acid, and 0·1030 water.

Calculated numbers.	Found.		
	I.	II.	III.
C_{20} = 57.14	57.13	57·06	57·09.
H_{10} = 4·77	5·04	5·09	5·04.
O_{10} = 38·09	37·83	37·85	37·87.

From these results it is evident that the carbon, hydrogen, and oxygen in larixinic acid are in the proportion of $C_2H_1O_1$, or some multiple of these numbers, $C_{20}H_{10}O_{10}$ being the numbers we have adopted as the more probable.

When a quantity of larixinic acid was dissolved in a great excess of liquid ammonia, a yellow-colored solution was produced; when this was evaporated to dryness over sulphuric acid *in vacuo*, the larixinic acid was deposited in crystals which were nearly unaltered. It gave its characteristic reactions with salts of iron, and when boiled with milk of lime gave off no trace of ammonia. The combination which larixinic acid forms with ammonia is, therefore, so feeble that it is decomposed by the volatility of the ammonia. In this respect, therefore, and its forming no hydrate, larixinic acid closely resembles both pyrogallic and oxyphenic acids.

* The crystals of larixinic acid catch fire readily and burn with a bright flame, leaving no residue.

When larixinic acid was treated with an excess of aqua potassæ it very readily dissolved, forming a yellowish solution. When dried over sulphuric acid *in vacuo*, the potash combination formed long flattish crystals having considerable lustre, but of a reddish-brown color. These crystals, when pressed between folds of blotting paper, to free them from the excess of potash and recrystallized *in vacuo*, yielded crystals which were more deeply colored than the first. This potash combination is so very feeble that it is decomposed by carbonic acid. It contained a considerable quantity of potash ; but I have not been able to obtain it of a constant composition.

A solution of larixinic acid gives no precipitate, either with lime-water or with saccharate of lime. The behaviour of larixinic acid with baryta is extremely singular and characteristic. When a solution of caustic baryta is added to a concentrated aqueous solution of larixinic acid, the latter being in excess, a bulky, semi-transparent, gelatinous precipitate immediately falls, and if the solutions are concentrated fills the whole vessel. This precipitate, which considerably resembles hydrated alumina, is but slightly soluble in cold water, but it dissolves very readily in boiling water, from which it is again deposited on the cooling of the liquid. This baryta compound is readily decomposed by carbonic acid. When thrown on a filter and washed, the air being carefully excluded, it was dried *in vacuo* over sulphuric acid, and was then found to contain, as the mean of two experiments, 34·92 per cent. of baryta.

A solution of larixinic acid yields no precipitate with either basic or neutral acetate of lead, neither is it precipitated by nitrate or ammonio-nitrate of silver; but when its solution in the latter salt is boiled, the silver is reduced in a pulverulent state. Larixinic acid forms no precipitate with perchloride of platinum, even on the application of heat. It does not contain any nitrogen. It does not reduce oxide of copper when tried by Trommer's test. It dissolves in concentrated sulphuric acid, but no conjugate combination is produced, as was ascertained by neutralizing with carbonate of baryta, larixinic acid being obtained unchanged. When larixinic acid is boiled with a mixture of hydrochloric acid and chlorate of potassa, it is decomposed, but without the formation of chloranile. When it

is boiled with a solution of hypochlorite of lime, no coloration is produced. It is readily attacked by nitric acid, especially when assisted by heat; nitrous fumes are given off, and oxalic acid is the only fixed product. It is also readily attacked by bromine, especially when assisted by heat. Abundant vapors of hydrobromic acid are given off, the larixinic acid being entirely destroyed and converted into an uncrystallisable resin. The salts of copper produce an emerald green color in solutions of larixinic acid, but no precipitate. Chloride of manganese produces neither coloration nor precipitation. Protosulphate of iron strikes a brownish-red color with solutions of larixinic acid, which acquire a brighter red color on standing, resembling meconate of iron. Perchloride and persulphate of iron produce a beautiful purple dahlia-color, which is very persistent, and stands dilution well. Its reactions with salts of iron are very characteristic of larixinic acid, which forms an excellent reagent for the detection of salts of iron, even in very minute quantity. In this way the presence of iron, in tolerably pure sulphate of copper, can readily be detected by the purple coloration produced. Larixinic acid does not affect neutral protonitrate of mercury in the cold; and on the application of heat no mercury is reduced.

Larixinic acid appears to be peculiar to the larch-tree; at least I have not been able to find a trace of it in the bark of the spruce fir (*Abies excelsa*,) or in that part of the Scotch fir (*Pinus sylvestris.*) Larixinic acid evidently belongs to that small group of substances of which pyrogallic acid and pyrocatechine, the oxyphenic acid of Gerhardt, are the only other members yet known. Larixinic acid is much less easily oxidisable than oxyphenic acid, which again is less easily oxidated than pyrogallic acid. Larixinic acid volatilises at a much lower temperature than either of these two substances, from which it also differs in being a ready-formed proximate principle, and not an educt.

Addendum.—In consequence of the extremely feeble, if not somewhat doubtful, acid properties of the so-called larixinic acid, perhaps the name *Laraxine* would be more appropriate; but in that case the name of pyrogallic acid should be altered to *pyrogalline*, and that of oxyphenic acid to *pyrocatechine*, the name originally given to it by Zwenger.—*Trans. Royal Society*, 1862.

Abstract of the Minutes of the Philadelphia College of Pharmacy.

At a stated semi-annual meeting of the College, held at the Hall, 9th mo. 29th, 1862. Present 17 members.

The President in the Chair. The Secretary being absent from the city, W. C. Bakes was appointed Secretary *pro tem.* The minutes of the last meeting were read and adopted, after which the minutes of the Board of Trustees, since the annual meeting, were read by Alfred B. Taylor, Secretary of the Board, from which it appears that H. T. Peck has been elected a resident member by the Board. The delegates appointed by the College to the American Pharmaceutical Association, reported through the Chairman, Samuel F. Troth, which report was accepted.

To the Philadelphia College of Pharmacy.

The Delegates to the American Pharmaceutical Association report:

That they all, with the exception of one member, attended the Tenth Annual Meeting of the Association, which was held in our hall on the 27th, 28th, and 29th of 8th mo. (August) last. The meetings, embracing five long sessions, were well attended, delegates from the Colleges of Baltimore, New York, Boston and Philadelphia, together with members of the Association from various parts of the United States, being in attendance. The proceedings of the Association were very interesting, and are in process of publication by the Committee charged with that subject. On behalf of the delegates, SAMUEL F. TROTH, Chairman.

Charles Bullock, on behalf of the Committee on deceased members, read the following obituary notice on the death of our late fellow-member, Henry C. Blair, which was accepted and ordered to be entered on the minutes.

Henry C. Blair was born in Carlisle, Penna., on the 26th day of December, 1816.

Having learned the business of a pharmaceutist with Franklin R. Smith, at the corner of Eighth and Walnut Streets, he took the degree of graduate in Pharmacy in this College in 1836.

About two years subsequent, he succeeded to the proprietorship of the establishment in which he had received his professional education, and which in after years under his judicious management, became one of the most favorably known, and prosperous dispensing establishments in this city.

Though much engrossed with responsible business pursuits, Mr. Blair was not unmindful of the claims of the community, and of his profession in its organized capacity, upon his time and attention. In 1842 he became a resident member of this College, and was for many years an active member in its Board of Trustees. Soon after the establishment of the American Pharmaceutical Association he became a member of that body, and served as a delegate from this College to the fifth annual meeting of the Association in 1856.

His example and influence were favorable to the elevation of the stan-

dard of education and professional ethics among pharmaceutists One of his characteristic and useful productions was a code of regulations for the organization and regulation of his own shop. The admirable discipline of this establishment was founded on a just appreciation of the rights and interests of the young men entrusted to his care, and their responsibility to himself and to the community. A healthy moral tone pervaded the establishment, and many young men educated to their vocation under his tuition, and who have for themselves since entered upon the duties of a business life, will appreciate the lessons he inculcated in all his intercourse with them.

For some years past, the failing health of our fellow member prevented his former zealous attention to business. Succumbing gradually to the inroads of pulmonary disease, he departed this life on the 20th day of August, 1862, aged 45 years, 7 months and 24 days, full of Christian faith and hope. Cut off in the prime of his life, his memory will long be cherished among those whose intercourse with him qualified them to estimate and prize his unobtrusive worth.

The report of the Committee on Herbarium, was read by George J. Scattergood, and on motion it was referred for publication in the Journal.

The Committee on Herbarium present the following report of its Chairman, John M. Maisch, in relation to plants found growing and collected in the neighborhood of New York City.

They also report the reception of a box of very fine specimens illustrative of the flora of our State, presented by Prof. Thomas C. Porter, transmitted through Charles A. Heinitsch, of Lancaster, Pa., comprising among others

Coptis trifolia, Salisb.
Caulophyllum thalictroides, Mx.
Podophyllum peltatum, L.
Dentaria diphylla, L.
" laciniata Muhl.
Barbarea vulgaris, R. Br.
Solea concolor, Girgcis.
Viola rotundifolia, Mx.
" Canadensis, L.
" hastata, Mx.
Helianthemum Canadense, Mx.
Lechea major, Mx.
Ascyrum Crux-Andreæ, L.
Hypericum ellipticum, Hook.
" Canadense, L.
Elodea Virginica, Nutt.
Alsine Michauxii, Fenzl.
Stellaria longifolia, Muhl.
Linum Virginianum, L.
Oxalis acetosella, L.
Geranium Carolinianum, L.
Acer spicatum, Lam.
Polygala sanguinea, L.
" cruciata, L.
" Nuttallii, T. & G.
" senega, L.
" pancifolia, Willd.
Desmodium rotundifolium, DC.
Lespedeza capitata, Mx.
Stylosanthes elatior, Swz.
Vicia Americana, Muhl.
Phaseolus perennis, Walt.
" helvolus, L.
Prunus pumila, L.
Spiræa tomentosa, L.
Dalibarda repens, L.
Rubus odoratus, L.
Crataegus coccinea, L.
Ammaria humilis, Mx.
Epilobium molle, Torr.
Circæa alpina, L.
Heuchera Americana, L.
Hydrangea arborescens, L.
Chærophyllum procumbens, Lam.
Syphoricarpus vulgaris, Mx.
Lonicera parviflora, Lam.
Diervilla trifida, Mœnch.
Cornus Canadensis, L.
Fedia olitoria, Vahl.
Liatris scariosa, Willd.
" spicata, Willd.
Kuhnia eupatorioides, L.
Eupatorium teucrifolium, Willd.
" rotundifolium, L.
Sericocarpus solidagineus, Nees.
Aster patens, Ait.
" dumosus, L.
Diplopappus umbellatus, Torr. and Gr.
Solidago latifolia, L.
" puberula, Nutt.
" speciosa, Nutt., var. Ang.
" rigida, L.
" orguta, Ait.
" adora, Ait.
" lanceolata, L.
Chrysopsis Mariana, Nutt.
Polymnia uvedalia, L.
Xanthium spinosum, L.
Gnaphalium purpureum, L.
Nabalus albus, Hook.
Campanula rotundifolia, L.
Rhododendron maximum, L.

Dodecatheon Meadia, L.
Lysimachia lanceolata, Walt.
Epiphegus Virginiana, Bart.
Salvia legrata, L.
Physostegia Virginiana, Benth.
Phacelia parviflora, Purrh.
Phlox divaricata, L.
Ipomœa lacunosa, L.
Nicandra physaloides, Gærtn.
Gentiana Andrewsii, Griseb.
" saponaria, L., var. lin.
Bartonia tenella, Muhl.
Bœhmeria cylindrica, Willd.
Spiranthes cernua, Richard.
Pogonia verticillata, Nutt.
Allium cernuum, Roth.
Heteranthera reniformis, Ring. and Pav.
Scleria triglomerata, Mx.
Calamagrostis coarctata, Torr.
Aristida purpurascens, Parv.
Eragrostis poæoides, Beauv.
Festuca tenella, Willd.
Atlosorus atropurpureus, Kenzl.
Camptosorus rhizophyllus, Rink.
Onoclea sensibilis, L.
Lygodium palmatum, Satz.
Lycopodium dendroideum, Mx.
Teleginella apus, Sporis.

The Committee have also preserved fresh specimens, this year, of a few of the plants common in this locality, though, from a variety of reasons, have not increased the collection much in this direction during the past season.

To the Philadelphia College of Pharmacy.

Shortly after the semi-annual meeting in September, 1861, the undersigned, Chairman of the Committee on Herbarium, removed to New York, and in consequence of his connection with the College of Pharmacy of the city of New York, will reside here permanently.

Owing to this removal, I have been unable to take an active part in the labors of the Committee. As soon as time and circumstances would admit, I have undertaken botanical excursions in the neighborhood of New York, and hoped to be able to lay before the College a report on the flora of this vicinity, as compared with that of Philadelphia. My experience is, however, by far too limited yet, so that I must confine myself to but few remarks.

From the proximity of this city to the sea coast, it was to be expected that in many respects, the flora here would be of a different character from that near Philadelphia. Many salt-water plants are growing here, not to be met with there, and a large number of exotic plants are found growing spontaneously or naturalized, which I have not seen in this condition near Philadelphia. The following list embraces those plants, which, from my present observations, grow more frequently in this locality; some of them, it will observed, requiring a saline soil.

Ranunculus sceleratus, Lin. Rhus copallina, Lin. (Most frequent on Long and Staten Islands.) Dianthus armeria, Lin. Spergularia rubra, Pers. (Very frequent on the meadows of Hudson co., N. J.) Hibiscus moscheutos, Lin. Berberis vulgaris, Lin. Trifolium agrarium, Lin. Medicago lupulina, Lin. (Rather frequent in waste places.) Melilotus officinalis, Willd. and albus, Lam. (Both species are spontaneous on Long Island.) Vicia tetrasperma, Loisel. and hirsuta, Koch. Potentilla argentea, Lin. Rosa micrantha, Smith. (Spontaneous in West Chester co., N. Y.) Rubus odoratus, Lin. (Was found only near Guttenberg, N. J.) Henea verticillata, Kunth. Opuntia vulgaris, Mill. (This cactus is very frequent in New Jersey, several miles from Philadelphia; I have found it frequently on Manhattan Island and in Westchester co. Pastinaca sativa, Lin. (Appears to be perfectly naturalized in several localities on Manhattan and Long Islands.) Cichorium endivia, Lin. (Spontaneous in several places on Manhattan Island.) Matricaria parthenium, Lin. (Is rarely spontaneous near Philadelphia, more frequent on Long Island.) Anthemis arvensis, Lin. (Rather frequent around New York, while Maruta cotula, DeC., and Leucanthemum vulgare, Lam. are scarcer here than in the immediate neighborhood of Philadelphia.) Solidago lanceolata, Lin. (Is very frequent in moist

places of Hudson co.; rarer in Camden co., N. J. Other species of this genus and of that of Aster could not be collected for want of time.) Rudbeckia hirta, Lin. Pluchea camphorata, DeC. Iva frutescens, Lin. (Both plants grow in salt-water marshes.) Antennaria margaritacea, R. Br. (This beautiful species is common on the dry hills of Long Island.) Veronica hederæfolia, Lin. (Becoming frequent on Staten Island and along the hills of New Jersey near the Hudson River.) Thymus vulgaris, Lin. (Spontaneous near Guttenberg, N. J.) Anagallis arvensis, Lin. Solanum dulcamara, Lin. and nigrum, Lin. (The last species was found by me only in one or two places near Philadelphia, but occurs scattered on both banks of the Hudson from Fort Hamilton to Westchester co., N.Y.) Lycium barbarum, Lin. (Becoming spontaneous.)

From the collections made during this summer, I have sent the following species to the College which were not heretofore collected by the Committee:

Hibiscus moscheutos, Lin. Dianthus armeria, Lin. Spergularia rubra, Pers. Vicia tetrasperma, Lois. V. hirsuta, Koch. Melilotus albus, Lam. Medicago lupulina, Lin. Trifolium agrarium, Lin. Rubus odoratus, Lin. Rosa micrantha, Smith. Potentilla argentea, Lin. Nasæa verticillata, Kunth, var. pubescens. Pastinaca sativa, Lin. Antennaria margaritacea, R. Br. Gnaphalium purpureum, Lin. Iva frutescens, Lin. Pluchea camphorata, DeC. Cichorium endivia, Lin. Rudbeckia hirta, Lin. Anthemis arvensis, Lin. Lysimachia lanceolata, Walt. Anagallis arvensis, Lin. Thymus vulgaris, Lin. Salix fragilis, Lin., var. Russeliana. Microstylis ophioglossoides, Nutt. Aplectrum hyemale, Nutt.

With regard to the botanical exchanges with Europe, I have to remark, that I owe an answer to Dr. Flükiger, of Bern, and I shall advise him of the Committee, if I be favored with a notice of its election. I would merely remind, that besides plants, he desires specimens of strictly American drugs, in exchange for which he will furnish such plants and drugs of Switzerland, as the Committee may designate.

No answer has yet been received from the other gentlemen to whom botanical specimens were sent.

All of which is respectfully submitted, J. M. Maisch.

Brooklyn, N. Y., September 27th, 1862.

John M. Maisch having removed to reside in New York, tendered his resignation as a member of this College. After some expression of opinion, the following resolution was unanimously adopted:

Resolved, That the resignation of John M. Maisch be laid on the table, and that in consideration of his valuable services to this College, his annual contributions be remitted.

William Procter, Jr., Editor of the American Journal of Pharmacy, called attention to the clause, in the 101st section of the law to provide Internal Revenue, &c., exempting officinal preparations, and others—the formula of which have been made public—from the stamp duty imposed upon medicines and preparations, and stated that he was in receipt of a number of letters from various parties enclosing recipes for publication in the Journal, and suggested some action of the College to meet the emergency. The following preamble and resolution, by Edward Parrish, were read by William J. Jenks, and unanimously adopted, ordered to be entered on the Minutes, and published in the Journal.

Whereas, by the terms of the law to provide internal revenue, and to pay the interest on the public debt, a specific stamp tax is laid on all secret or proprietary medicines, and an exception made in favor of preparations of which the "full and proper formula is published in any Pharmaceutical Journal now issued by any incorporated College of Pharmacy;" and

Whereas, attempts will probably be made to evade this tax by the publication of formula of no public interest, through the American Journal of Pharmacy, which was established with an exclusive view to the advancement of Pharmaceutical knowledge, and discouragement of quackery and empyricism; therefore

Resolved, That the Editor and Committee of Publication be and are hereby instructed to decline the insertion in the Journal of any empyrical or other formula not adapted to increase pharmaceutical knowledge, or to promote the general interests of the profession, and that we will discourage any evasion of the law by those to whom it was designed to apply.

Charles Bullock proposed that a Committee be appointed to confer with Commissioner Boutwell, with reference to various points in the law requiring some explanation, and that a copy of the foregoing resolution be enclosed to him, and that the Committee have power to use the seal of the College, and report to the Board of Trustees at its next meeting. Charles Bullock, Alfred B. Taylor, and William Procter, Jr., were appointed on that Committee. On motion, Peter Williamson was also added to this Committee as Chairman.

The semi-annual election of Trustees, &c., was now ordered, John C. Savery, and Samuel S. Bunting acting as tellers, who reported the following as elected:

Trustees.

Wilson H. Pile,	Evan T. Ellis,
Charles Bullock,	William J. Jenks,
Alfred B. Taylor,	George J. Scattergood,
William Evans, Jr.	William C. Bakes.

Committee on Deceased Members.

Edward Parrish. William Procter, Jr.,
Charles Bullock.

Committee on Herbarium.

George J. Scattergood, William R. Warner,
Thomas P. James.

On motion, the College adjourned.

WILLIAM C. BAKES, *Secretary pro tem.*

Editorial Department.

THE LATE MEETING.—In the haste incident to getting out the detailed notice of the proceedings of the Association at the end of our last number, we entirely forgot to allude to an episode of the outside history of the meeting, which in proportion to its extent was largely productive of good fruits. At the close of the meeting on Friday, Aug. 29th, Edward Parrish invited those members who were strangers to join in a yachting excursion up the Delaware to Riverton, to return late in the evening by steamer. A number of gentlemen accepted the invitation, and between 4 and 5 o'clock the party having embarked at Smith's Island on two yachts were soon careering up the river by aid of a stiff breeze. As both vessels were good sailers, some excitement grew out of the competition to reach Riverton; and as, from the direction of the wind and the course of the river, some tacking was required before the boats were sufficiently to the windward to pass Treaty Island, ample room was afforded to the commanders to contend for the advantage. The gentlemen expressed themselves much gratified with the sail, which, varied as it was by objects of interest along the right bank of the river and the excitement of managing the vessel under a strong breeze, was to us very pleasant.

Arrived at Riverton, the party were landed in boats, and conducted to the residence of Mr. Parrish, where we were welcomed by Mrs. Parrish, who, "on hospitable thoughts intent," soon after invited the party to partake of an excellent entertainment, to which they did ample justice. The evening, which was agreeably cool, passed off pleasantly in conversation during a stroll along the bank of the river; and as the period for returning approached, the party collected on the pier to await the steamer, which in due time was seen in the distance; but lo! she kept on her course despite the tolling of the bell, and left the party to provide a passage in some other way. The disappointment was taken in good humor, and finally it was arranged that some should return to the city by private conveyance, others took the late line to N. York, whilst the remainder were comfortably accommodated for the night, and left for their several homes on the following morning, well pleased with their trip.

"THE JURIES BILL" IN THE BRITISH PARLIAMENT.—After a considerable struggle this bill has become a law under the caption "An act to give greater facilities for summoning persons to serve on Juries, and for other purposes relating thereto." The main cause of the struggle arose from the following clause inserted through the exertions of the council of the Pharmaceutical Society, viz. "All persons duly registered as pharmaceu-

tical chemists according to the provisions of an act entitled "An Act for regulating the qualifications of pharmaceutical chemists," shall be and are hereby absolutely freed, and exempted from being returned, and from serving upon any Juries or Inquests whatsoever, and shall not be inserted in the lists to be prepared by virtue of the principal Act of this Act." After being rejected in the House of Commons, it was passed in the House of Lords, the amendment again rejected by the Commons, but in a modified form retaining all that related to the pharmaceutical chemists, it passed the Commons on the 31st of July, to the great gratification of the members of the Pharmaceutical Society, who in addition to other privileges are thus publicly exempted from a very onerous public duty.

But while the 2000 or 2500 members of that Society are thus exempted, perhaps 30,000 other persons under the name of chemists and druggists are yet subject to the Jury service. This public and legal endorsement of the society must raise its status yet higher, and offer a powerful inducement to chemists and druggists to qualify themselves for membership, which is open to all who will undergo the legally requisite ordeal.

THE INTERNATIONAL EXHIBITION AT LONDON, 1862.—The Report of the Jury on section B—Medical and Pharmaceutical Products and Processes—has just been received from the Secretary, Mr. Daniel Hanbury. The Report is too long to republish entire, but the following extracts from it are offered for the information of our readers. The Jury consisted of Prof. Von Fehling, of Stuttgart, Chairman, Daniel Hanbury, of London, Secretary, Mr. Morson, Dr. Redwood and Mr. Warrington, of London, Dr. Neligan, of Dublin, Prof. Schrœtter, of Vienna, Prof. Tomasi, of Paris, Prof. Wurtz, and M. Menier, of Paris.

The report is in three sections: 1. Pharmaceutical products from the mineral kingdom, including preparations like iodoform, chloroform, carbolic acid, alkaline and earthy salts, metals and metallic salts. These we must pass over for the present, and occupy what space we can afford with the second and third parts.

2. PHARMACEUTICAL PRODUCTS AND PREPARATIONS FROM THE VEGETABLE KINGDOM.

a. Vegetable infusions, decoctions, and solutions.—Numerous specimens of aqueous infusions and decoctions in a concentrated form, preserved with a minimum amount of alcohol, are exhibited in the British section of the Exhibition. Many of these preparations, which display considerable pharmaceutical skill, would doubtless be found useful and convenient medicines, but the Jury can by no means admit that their employment in the place of freshly made infusions would be a desirable innovation. Analogous to the proceeding, but in a still more concentrated form, may be mentioned the preparations known as *fluid extracts*, a considerable variety of which are used in North America, as may be seen by examining the specimens contributed by the Philadelphia College of Pharmacy, and by Mr. W. Saunders, of London, West Canada. The only fluid extract in common use in England is that of sarsaparilla, a preparation containing about half its weight of extract of pilular

consistence, together with a little alcohol. Several other fluid extracts are exhibited, as those by Messrs. Savory and Sons, which include fluid extracts of opium, taraxacum, rhatany, roses, sumbul, &c. These preparations are stated to contain about fifteen per cent. of glycerine.

Solutions of various medicinal substances in pure glycerine, called *Glycerides*, are shown by Mr. W. Dickinson, of London, as convenient preparations for the external and internal administration of medicines. Among a considerable number we have observed the following:—Glyceride of aloes, of senna, of chloride of zinc, of bromide of iron, of iodide of sulphur, and of sulphuret of potassium.

b. Tinctures and *syrups* are shown in the collection of medicines exhibited under the auspices of the Pharmaceutical Society of Great Britian; there are also some preparations of this class contributed by Holland, Portugal, and Turkey.

c. Extracts and Inspissated Juices.—The collections of these preparations in the British section of the Exhibition appeared to the Jury, for the most part, highly commendable. Among those that were noticed with especial satisfaction, the extracts of Mr. Holland, of Market Deeping, and of Mr. Ransom, of Hitchin, may be cited. The Jury had also great pleasure in examining the extracts prepared by Mr. Squire, Messrs. J. Watts and Co., Messrs. Wright, Francis and Co., Messrs. Curtis and Co., and Mr. W. Hooper, all of London. But few pharmaceutical extracts have been sent to the Exhibition from abroad, which is probably due to the unattractive appearance of such preparations, and also to the fact that in Germany at least they are not manufactured on a large scale, but generally in the laboratory of each pharmaceutist. An Austrian exhibitor has however contributed a series of the extracts prescribed in the Austrian Pharmacopœia; the Jury have examined them, but have not been favorably impressed with them as compared with similar products from English laboratories.

In France, extracts are extensively manufactured by M. Berjot, of Caen, who exhibits a large number. These extracts, which in appearance are entirely different from those of the British pharmaceutist, are prepared *in vacuo*, the evaporation being carried to complete dryness. Thus produced, we find them in the form of dry pieces, often several inches in length, and of an oblong form, very porous and light, and generally pale in color. Extract of liquorice for instance, as shown by Mr. Berjot, is in extremely light and spongy, pale-bluff, brittle, oblong cakes; in fact, in appearance it suggests pieces of *dried froth*. All the extracts are contained in wide-mouthed bottles, each provided with a hollow metallic stopper ingeniously contrived to contain *lime*, the object of which is to absorb the humidity of the air necessarily admitted each time the bottle is opened. In fact they are mostly so hygroscopic, that without some precaution of this nature, it would be impossible to maintain them long in their original condition; as evidence of which we may state that three or four of which we enclosed small specimens in pill-boxes, were found at the expiration of a few days to have shrunk to perhaps a tenth of their usual volume, and to have assumed the form of ordinary soft extracts.

Of the care with which M. Berjot's extracts are prepared we entertain no doubt; but we are far from being convinced of the expediency of carrying the desiccating process to the highest extent, and of attempting to maintain the extracts in a perfectly dry condition for daily use. We think that such extracts present in general a very favorable condition for transport to other countries, being, we should imagine, susceptible of no change so long as they are kept dry. But upon the shelves of the dispensary, where a large business is carried on, we can imagine that they would, from their proneness to change, be a source of perpetual annoyance. Still as we are assured* that M. Berjot disposes commercially of his dry extracts to the extent of 4400 lbs. (2000 *kilo.*)

* 'Bulletin de la Société d'Encouragement,' t. viii. (1861), p. 143.

annually, it appears evident that our objections have not all the practical force we should otherwise claim for them. Vegetable extracts, also prepared *in vacuo*, and reduced to dryness, but in a massive and not porous form, are shown by M. Menier, of Paris.

Extract of liquorice is exhibited by several Italian, French, and Spanish manufacturers, amongst whom may be mentioned the house of Barracco, which produces 200,000 kilo. annually. Very good extract is also shown in the Austrian section by M. Quapill, to whom is due the merit of having introduced the manufacture of liquorice into Moravia.

Under the head of extracts it is proper we should also notice the substance called *podophyllin*, recently introduced from the United States into British medicine as an alterative and purgative. Podophyllin is prepared from the root of *Podophyllum peltatum*, L. (*Ranunculaceæ*) by exhausting it with alcohol, concentrating the alcoholic solution, and pouring it into water. The dark-greenish resin thus separated, constitutes, when washed and dried, *podophyll n*. The same process is said to be adopted in America for extracting resin from numerous other roots, as those of *Sanguinaria canadensis* L., *Veronica virginica* L., *Hydrastis canadensis* L., *Iris versicolor* L., &c., &c.

d. Essential oils (medicinal).—The most extensive and remarkable collections are those contributed from Leipzig, where a very important manufacture of these products is carried on by the firms of Heine and Co., E. Sachsse and Co., and Schimmel and Co. Several of the oils exhibited by those houses were entirely new to most of the Jury. The essential oils of Dr. F. G. Geiss, of Aken-on-Elbe, near Magdeburg, of Dr. Wagner, Pesth, of Dr. Lamatsch, Vienna, and of Messrs. Boyer and Heil, and Co., of Gignac, Herault, France, deserve commendation. In the British section the essential oils, though fewer in number than the foreign, are not less excellent. The principal exhibitors deserving mention are Mr. Holland, of Market Deeping, and Mr. Ransom, of Hitchin. The collections just named are those of manufacturers on a large scale; but numerous other specimens of more or less importance have also been observed by the Jury. *Cajuput oil* is sent from the Dutch East Indies, a sample also from New Caledonia, and one from New South Wales. *Oils of peppermint* and *wintergreen* are contributed by the United States, and *otto of rose* by Turkey. There is also a sample of the essential oil with which otto of rose is adulterated, contributed by Mr. S. H. Maltass, of Smyrna; this oil which, we believe, is now almost invariably mixed with the Turkish otto, is the produce of *Andropogon pachnodes*, Trin., a fragrant grass, abundant in the north-western provinces of India, and not, as sometimes stated, of a pelargonium. It is shipped from Bombay, whence it is carried to Turkey, partly by native traders by way of the Red Sea and Egypt, and partly by way of England. From its similarity in odor to the essential oil distilled at Cannes in Provence, and in Algeria, from *Pelargonium Radula*, Ait. var. *roseum*, it is frequently sold under the name of "*Turkish oil of Geranium.*"

e. Fixed Vegetable Oils.—Of these substances those alone which could claim the application of *medicinal* were considered to belong to our Jury, the remainder being referred to Class IV.

Castor Oil and Seeds.—The exhibition contains numerous samples of this oil, of which those produced in Italy deserve particular attention. This castor oil is extracted from the seed grown in the north of Italy, where the plant is doubtless an annual. That shown by M. Mazzuchetti, of Turin, appeared to be of excellent quality; the suite of specimens, including the seeds in various states, exhibited by Messrs. Valeri and Co., of Legnago, province of Verona, deserves mention. The latter firm are stated to produce by cultivation 2,000,000 kil. of seed annually. There are numerous other samples of castor-oil seeds, more or less remarkable for their variation in size, color, and mark, ings, contributed by other countries, frequently accompanied by the oil. Those shown by M. Bélanger, director of the botanical garden at St. Pierre-Martinique, comprising half a dozen sorts, each with the botanical name of

the particular species of *Ricinus* yielding it, would form an acceptible addition to any collection of Materia Medica.

f. Vegeto-Alkalies, their Salts, and other Crystalline Principles of Medicinal Substances.—In this department the Exhibition presents a display which is highly creditable to the progress of chemical knowledge, and its application to industrial purposes. Nor should it be otherwise when we reflect on the extraordinary attention which organic chemistry has of late received, the great diffusion of knowledge regarding its laws, and the numerous triumphs which in various directions it has achieved

Vegetable alkaloids are contributed by England, France, Germany, Italy, Turkey, and Brazil—many of them as specimens of unequalled purity and beauty. To commence with the most important, we will notice those of cinchona bark.

Quinine.—The sulphate is exhibited by two English and several German, French, and Italian manufacturers. Many of the samples were chemically examined by the Jury, and were found in every case to be of satisfactory purity. The purity of a drug so important and high-priced as quinine ought to engage the attention of each pharmaceutist, who should rigorously refuse all which may not stand the required tests, nor should the medical man and the directors of hospitals exercise a less vigilant care. The use of quinine imperfectly purified is open to objection, for which the reduction in price by no means compensates. The admission of so valuable a medicine in a form acknowledged to be impure, and that without any standard by which to determine the amount and nature of impurity which are to be held allowable, affords opportunity for sophistication only limited by the principle or prudence of the manufacturers. In such a compound, the question must naturally arise: How much of this effect is due to the quinine, how much to the quinidine, and how much to the other constituents of this preparation? We think it would be altogether more scientific to discard such a substance, and to employ the cinchona alkaloids in those forms of purity in which they are now so easily obtainable.

The quinine salts exhibited are very numerous, and, we may add, very unnecessary, so far as medicine is concerned. The citrate, phosphate, hypophosphite, hydrochlorate, acetate, lactate, valerianate, tannate, kinate, picrate, and hydroferrocyanate are all to be seen.

Cinchonine and *quinidine*, and their salts, are also displayed in several collections; *aricine* and its sulphate so far as we are aware, in only one—that of Messrs. Howards and Sons. This house also exhibits a specimen of the cinchonidine of Pasteur, and a very large one of its sulphate. Sulphate of cinchonidine is also contributed by Messrs. Dufour Brothers, of Genoa.

We may also here name as eminently worthy of notice (mainly as an indication of skill and patience) the extraordinary series of cinchona products displayed by Dr. Zimmer, of Frankfort-on-Maine. This series, which numbers about a hundred specimens, includes combinations of the cinchona alkaloids, quinine, quinoidine, quinidine, cinchonine, and cinchonidine, with a great variety of acids, mineral and vegetable. It also includes, what are far more interesting, pure kinic acid, colorless and well crystallized, kinate of lime, pure cinchona-bark wax (a greenish-gray substance), the fatty acid of this wax in a pure state called cincho-cerotic acid (*Cincho-cerotinsäure*), dalleiochin, &c.

The chemical products of opium are extremely well represented by exhibitors from Great Britain, France, Germany, and Italy. M. Menier, of Paris, displays crystals of pure morphia, which are the finest we ever saw, and his hydrochlorate of the same base is hardly less excellent. Codeine forms a striking object in the case of Messrs. J. F. Macfarlan and Co., of Edinburgh, whose specimen has the form of a large basin of crystals. Messrs. T. and H. Smith, of Edinburgh, Morson and Son, of London, and Menier, likewise exhibit good specimens of this alkaloid; but for magnitude of crystals there is nothing to equal that shown by M. Merck, of Darmstadt. Of the other prin-

ciples contained in morphia, we may signalize the following as being remarkably well shown:—The narceine of Messrs. Morson and Son, meconine of M. Menier, papaverine, narcotine, muriate of thebaine, and meconic acid of Messrs. Smith; the last named firm also exhibit a body named by them *thebolactic acid*, of which they claim the discovery, but of which no account has yet been published. They also show two thebo-lactates, namely those of copper and of morphia.

Strychnia.—The only British manufacturer on a large scale is, we believe, Mr. Hulle, who exhibits excellent specimens of the alkaloid and its salts. From the Continent we find strychnia contributed by M. Menier and Messrs. Laurent and Casthelaz, of Paris, and M. Merck, of Darmstadt. M. Menier, whose strychnia is in crystals of remarkable size and beauty, is also the exhibitor of a large specimen of *igasurine*, the only one we believe in the Exhibition. This alkaloid, which was discovered by Desnoix about the year 1853, is contained in nux-vomica, from the liquors of which, produced in the manufacture of strychnia, it may be separated after the precipitation of that alkaloid and the brucine by lime at a boiling temperature. From these aqueous liquors the igasurine, in an impure state, may be obtained by evaporation.* Igasurine is said to have medicinal powers of the same character as strychnia; but we are not aware that exact observations upon this subject have yet been instituted.

The collection of organic chemical products shown by M. Merck includes several substances of great interest and rarity, exhibited in very considerable quantities. Of such we may mention *elaterine*, of which there is a large specimen, well crystallized and perfectly white; also *cubebine*, *delphinine*, *anemonine*, *sulphate of sabadilline* and *scoparine*.

Atropine, now frequently used in the form of sulphate, for the dilation of the pupil, is shown M. Menier.

Messrs. Morson exhibit the valerianate, a salt the use of which in medicine is very undesirable, on the ground that it is not only highly deliquescent, but that it constitutes a gummy mass which it is no easy task to weigh with accuracy. It is moreover impossible to believe that the alkaloid combined with valerianic acid can occasion effects which would not be produced by the sulphate, a salt presenting no such objections.

Aloine.—Messrs. T. and H. Smith, of Edinburgh, to whom is due the discovery of aloine in 1851, exhibit it in the form of a mass of brownish-yellow crystals, which are not without beauty. Crystals of aloine, in great abundance, occur in a variety of Socotrine aloes, imported a few years since, which was in a semi-fluid condition, the evaporation not having been carried to the usual limit. In the aloes in question, the aloine subsides in the course of time to the bottom of the vessel as a yellow mass, the supernatant aloes being dark and transparent.

Aconitine, both amorphous and crystallized, is shown by Messrs. Morson and Son. The aconitine of these manufacturers is well known for its superiority in virulence, a fact which enables it to command a very high price. Messrs. Hopkin and Williams are also English manufacturers and exhibitors of this alkaloid.

Bibirine and its sulphate are contributed by Merck, of Darmstadt, and Macfarlane, of Edinburgh. A sample of the sulphate (now not unfrequently prescribed in London) is also sent by Mr. Knowles, of Demerara, from which colony the Bibiru Bark is an export.

Santonine, which has come into extensive use since the Exhibition of 1851, is chiefly manufactured in Germany. Messrs. Böhringer and Sons, of Stuttgart, who prepare it on a very large scale, exhibit one of the numerous excellent samples submitted to the Jury.

Pereirine.—This alkaloid is exhibited by Messrs. Ezequiel Correa dos Santos e Filho, Messrs. Aleixo Gary and Co., and Mr. Peckolt, all of Brazil; and is

* Gerhardt, 'Chimie Organique,' vol. iv. (1856), p. 182.

also to be found in the case of one English exhibitor. Its history dates from 1839, when it was discovered by Blanc, of Rio Janeiro,* in the bark called in Brazil *Pao Pereira*, and valued in that country as an excellent febrifuge and tonic. This bark, the origin of which has long remained uncertain, has recently been ascertained by Dr. Allemão, of Rio Janeiro, to be derived from *Geissospermum Vellossii*, Allem., a tree of the order *Apocynaceæ*. Pereirine is obtained by exhausting the pereira-bark with acidulated water, and treating the concentrated liquor with ammonia, which throws down the impure alkaloid. This may be rendered pure by re-solution in an acid, treatment with charcoal, and precipitation by ammonia. It then constitutes a pale-brown, pulverulent substance, which has not hitherto been obtained either colorless or in crystals. It is soluble in alcohol or ether, restores the blue of reddened litmus, unites with diluted acids to form neutral salts, which are mostly soluble in water or alcohol, but which, like the base, have only been obtained in an amorphous condition. An aqueous solution of a salt of pereirine is colored deep crimson by strong nitric acid; a reaction which takes place even when the solution is dilute. We are not aware of any ultimate analysis of this alkaloid having been made.

g. Vegetable acids.—*Tartaric* and *citric acids* are so well and extensively represented in all parts of the Exhibition, that we may be excused from mentioning the samples of any particular manufacturer.

Of *Racemic acid*, a specimen by Wagenmann of Vienna is shown in the Austrian Court.

Valerianic acid, in three forms—anhydrous, monohydrated and trihydrated—is contributed by Dr. Marquart of Bonn, who likewise sends fine *succinic* and *malic acids*, both colorless and pure.

Gallic and *tannic acids* are freely exhibited. One specimen, that of gallic acid shown by Messrs. Dunn, Heathfield and Co. of London, is remarkably beautiful for its crystallization.

Caincic acid, extracted from cainca root (Radix *Chiococcæ anguifugæ*, Mart.,) is among the rare products shown by Mr. Merck.

h. Unmanufactured Drugs of Vegetable Origin.—In the British section of the Exhibition there is a numerous collection of these products exhibited by various contributors, chiefly under the auspices of the Pharmaceutical Society of Great Britain. The samples are mostly very fine; some of them in fact almost *too good*, as they represent exceptional rather than usual forms of the drugs they illustrate.

The British colonies, including India, contribute large collections of vegetable Materia Medica which will repay careful study. The colonial possessions of France are also well represented, the suites of specimens from each being admirably arranged and clearly catalogued upon one general plan. We also find contributions of raw drugs from the South American Republics, Brazil, the United States, West Africa, Turkey, China, Japan, and the Philippines.

As it would unduly extend the present Report were we to attempt a detailed account of these numerous collections, we shall restrict ourselves to name a few of the more important, and also to mention in addition a few drugs which claim notice on the ground of recent introduction to European medical practice.

North American drugs are illustrated by a very excellent and numerous collection contributed by the Philadelphia College of Pharmacy. There are also numerous well-preserved specimens forwarded by Mr. William Saunders of London, Canada, and by Mr. Giroux of Quebec.

To H. E. Faik Pasha of Constantinople, the Exhibition is indebted for a very extensive series of specimens of raw products, alimentary, medicinal,

* Berzelius, "Jahresbericht über d. Fortschritte d. Chemie et Mineralogie," 23 Jahrg. 1844), p. 372.

&c., from Turkey, amongst which the numerous samples of opium deserve particular attention.

Mr. Sidney H. Maltass, of Smyrna, is also the exhibitor of a fine series of opiums, besides scammony, tragacanth, and some other drugs of Asia Minor.

M. Bélanger, director of the Botanic Garden at St. Pierre, Martinique, contributes an instructive series of West Indian drugs, which the Jury consider well deserving of commendation.

Mr. Theodore Peckolt, pharmacien of Cantagallo, Brazil, has sent a collection of small specimens of Brazillian drugs, which deserve the attention of pharmacologists.

Dr. Welwitsch, who has recently returned from a visit of several years to the Portuguese territories on the west coast of Africa, contributes numerous remarkable raw products collected during his journeys in those little-known regions; but the specimens being neither catalogued nor well arranged are not displayed as they deserve.

The productions of Hungary, including a few well-preserved drugs, are displayed in the collection of Mr. Vincent Jankó, of which a convenient separate catalogue is published.

The great project of introducing the *Cinchona* into India receives an illustration from two or three inconspicuous jars containing cinchona bark, produced upon the plantations of the Dutch Government in Java, contributed, together with botanical specimens of *Cinchona Calisaya*, Wedd. and *C. Pahudiana*, How., by Dr. Junghuhn.

Of the drugs which have to a greater or less extent come into use during the past few years, we may mention the following:—

Resin of Scammony-root.—The rude methods employed for the collection of scammony, and the extreme variability of that drug, induced Mr. Clark, an extensive manufacturer of extract of liquorice, residing near Smyrna, to suggest the advantages that would arise from replacing it by the pure resin obtained by a suitable process from the dried root. Mr. Clark not having in Asia Minor the requisite appliances for such a pharmaceutical operation, some of the root was forwarded to Professor A. W. Williamson of University College, London, who, after various experiments, recommended the following process:—The roots, previously crushed, are to be boiled first with water and afterwards with diluted acid, by which means they will be deprived of all matter soluble in those menstrua, while the resin will be left undissolved. They are then to be treated with alcohol, and the alcoholic solution being evaporated, the pure resin will remain. Numerous comparative trials of this resin have been made in the hospitals of London, and have established the conclusion that it is quite equal in medicinal activity to the best scammony. The substitution of resin of scammony-root for scammony, is not, however, officially sanctioned, and the new drug has as yet met with but little demand.

Root of *Actæa racemosa*, L. (*Ranunculaceæ.*)—This drug which has for many years had a place in the Materia Medica of the United States, has recently come into considerable use in England as a remedy in rheumatism, particularly in its acute forms; it has also been successfully employed in chorea, nervous headache, hysteria, &c. As a complete account of the drug, its natural history, mode of administration, &c., by Professor Bentley of London, has been recently published,* we think it unnecessary to enter into further particulars respecting it.

Kamala, is the Indian name of a brick-red powder, which consists of the minute glands rubbed from the capsules of *Rottlera tinctoria*, Roxb., a tree occurring in many parts of the East Indies. It is employed in medicine as a vermifuge, and is very effectual in the dose of one to two drachms; it may also be given in the form of tincture. Kamala has been imported into London to a considerable extent, and chiefly shipped to the Continent.

Bark of *Larix Europæa*, DC.; *Larch bark.*—It has been recently recom-

* "Pharmaceutical Journal and Transactions," for March, 1861.

mended as a stimulating expectorant, and has been prescribed by a few medical men in London and Dublin, in the form of tincture and extract. The bark, which contains numerous cells filled with resin, has an agreeable terebinthinous odor; whether it possesses any real advantage over the numerous terebinthinous remedies already in use, may well be doubted. We may mention, however, that a crystallizable volatile principle, to which the name *larixinic acid* has been given, has recently been obtained from larch bark, which at present is its only source: also that the bark contains a peculiar form of tannin.*

Guaco.—Attention has been recently called to the medicinal effects of the stems of certain species of *Aristolochia*, commonly known in South America by the name of *guaco*, and there used against the bites of venomous serpents. The drug is quite distinct from the stems of *Mikania Guaco*, H. B. K., also called *guaco* in some parts of New Granada. A good specimen, derived from *Aristolochia trilobata*, L., is sent from Trinidad by Mr. Sylvester Devenish of that island.

Bark of *Cerasus virginiana*, Michx., is employed in the United States as a tonic and sedative, and has recently been introduced to the notice of medical men in this country. It contains a bitter principle not yet isolated; also amygdalin, together with a substance analogous to emulsin, which, reacting on each other in the presence of water, yield hydrocyanic acid and a volatile oil resembling that of bitter almonds.†

Bark of *Ulmus fulva*, Michx., a North American tree, is remarkably mucilaginous, and of an agreeable odor. The infusion is a good demulcent, and recommended in dysentery and stranguary. The bark is also sometimes chewed as an expectorant, and in a bruised state may be used for poultices. It probably possesses no advantages over linseed, marshmallow, or other common drugs of the same class.

Anacahuite wood, a drug of unknown origin imported from Tampico, and extravagantly valued in Germany for a short time as a remedy for consumption. Experience has not confirmed the favorable statements first put forth regarding it, and it is now almost unsaleable. Chemical experiments have failed to detect in it any constituent that can explain the good effects alleged to have been obtained from its administration.

Dried herbs are well exhibited by Messrs. Butler and McCulloch of London, as well as by Mr. Holland of Market Deeping, and Mr. Ransom of Hitchin. There are also some very good samples shown by Mr. Benzon of Copenhagen and Messrs. Wilhelm and Co. of Vienna. M. J. G. Cavalli of Gothenburg exhibits some medicinal herbs excellently dried in a compressed form. The Jury are not acquainted with the process adopted for obtaining the extreme compactness and beautiful appearance for which the specimens are remarkable.

3. Pharmaceutical Products from the Animal Kingdom.

Cod-liver Oil.—The Exhibition contains many samples of this important medicinal agent, contributed by Newfoundland (including the French islands of St. Pierre and Miquelon,) Norway, and England. The pale oil manufactured in London is much esteemed, but the supply is by no means equal to the demand, and an immense quantity of foreign oil is also consumed. This pale oil is prepared by a process originally devised by Mr. Donovan of Dublin,‡ which consists in placing the perfectly fresh livers in a metallic vessel, and heating them with constant stirring to a temperature of 180° F., by which treatment they break down into a uniform, pulpy, liquid mass. This mass is immediately transferred into calico bags, whence the oil drains out; after filtration while still warm, it is sufficiently pure for use. In this state the oil con-

* Stenhouse. "Proceedings of the Royal Society," June 28, and July 10, 1861.
† Wood and Bache, "Dispensatory," Ed. 11, (1858), p. 627.
‡ "Dublin Journal of Medical Science," vol. xvii. (1840), p. 357.

tains, at the temperature of 60° F., a considerable deposit of stearine, which it is the practice of some pharmaceutists to remove by filtration, but of others to allow to remain, under the idea that the stearine, (which is perfectly fluid at the temperature of the human body) is no less efficacious than oleine. The cod-liver oil of Peter Moller of Christiania is prepared by a process essentially the same as that just described.

Dugong Oil.—This oil is produced from the bodies of two herbivorous cetaceous animals of the family *Manatidæ*, the one *Halicore Dugong*, Illig., an inhabitant of the Indian seas, the other *H. australis*, Owen, occurring off the northwest coasts of Australia. It has been lately employed as a substitute for cod-liver oil, especially in Australia. Samples from that colony, and also from Ceylon, afforded, we presume, by the two species of *Halicore* above named, have been sent to the Exhibition. That from Ceylon is a solid white fat, almost devoid of odor; those from Australia are liquid oils containing a deposit of stearine; all have a slight tallow-like taste, and but little smell.

Dugong oil, having no *fishy* smell and taste, is supposed to offer an advantage in these respects over cod-liver oil. We are not aware that any extensive trials of it have as yet been made in Europe.

Pepsine.—There are two English exhibitors of this substance, namely, Messrs. Morson and Son, and Mr. J. L. Bullock, and one Austrian, Dr. Lamatsch. Mr. Squire, as the agent of M. Boudalt of Paris, may also be named, though we think he does not display any specimen.

Messrs. Morson, who prepare pepsine from the stomachs of calves, exhibit it in the pure state as a gray extractiform mass: it is not, however, commonly sold in this form, being more convenient when reduced to a powder with starch, in which state it has received the name of *Poudre nutrimentive*. M. Boudault's pepsine, which, as we gather from his pamphlet, is prepared from the stomachs of sheep, is also mixed with starch. Mr. Bullock's pepsine is prepared from the stomach of the pig, upon the principle, we believe, that the pig's omnivorous habits render it probable that its gastric fluid would supply the best substitute for that of the human stomach. However this may be, Mr. Bullock's pepsine may well be superior in strength, as it is sold in an unmixed state. Dr. Lamatsch, as it would appear from his advertisement, employs the stomachs of both pigs and calves for the preparation of pepsine, which, like that of Mr. Bullock, is offered for use unmixed with starch.

[The remaining articles of animal Materia Medica call for but few observations. The common blistering flies (*Cantharis vesicatoria*, Fabr.,) are well shown among the productions of Hungary. *Mylabris Cichorii*, Fabr. (and M. *Sidæ*, Fabr.?), the best source of cantharidine, occurs among the drugs of India; a specimen of *Lytta vittata*, Fabr., in the collection of the Philadelphia College of Pharmacy,* and one of *Meloe maialis*, L., among the drugs of Spain.

Cantharidine is represented by a very large and fine sample from the laboratory of M. Merck; Messrs. T. and H. Smith likewise exhibit it.

Of *Ambergris* a fine mass may be noticed in the case of a Paris perfumer, M. Claye.

Musk is not well shown, though it would have been easy in London to display a series of specimens representing it in all its varieties. Of *Civet*, there is a solitary and bad specimen sent from India. *Castoreum* is shown by a Canadian exhibitor, as well as in the collection of the Pharmaceutical Society.]

* In the List of Awards, which we have not space to print, it is stated that the collection deposited by the Philadelphia College of Pharmacy received a medal.

OBITUARY.—Prof. Dr. G. F. Walz was born in 1817, in Waldmikelbach, Hesse Darmstadt, where his father held the office of revenue collector. When fourteen years of age, he was apprenticed to a pharmaceutist in Furth, and removed afterwards to Heidelberg, where he completed his studies. Subsequently he settled as apothecary at Speyer, Rhine-Pfalz, where he soon commenced his career of usefulness. Here he became one of the founders of the polytechnical school, and was active for several years as director of the pharmaceutical and chemical branches, in connection with which he opened his well-known Pharmaceutic-Chemical Institute, wherein a number of the young German pharmaceutists received their scientific education.

Walz knew the value of scientific literature, and regarded it as a duty incumbent upon every one to contribute his mite towards the progress of science. Many pharmaceutical journals of that time contain scientific researches from his pen, and his sphere of usefulness in this department became still greater after he had commenced the Neues Jahrbuch der Pharmacie, which afterwards was selected as the organ of the southern branch of the German Apothecaries Association, of which society Walz was the efficient President.

In 1856, he removed to Heidelberg as private instructor (Privatdocent) in Chemistry, Botany, and Pharmacology, and subsequently he was selected for the Chair of Chemistry at this celebrated university, which he occupied at the time of his death. His continued mental labors probably induced the disease which so soon terminated his useful career. In March of the present year, he was seized with a brain fever, from which he had apparently recovered, when on a journey he was taken with a relapse, and died suddenly at Zwingenberg, at the house of a friend. He was but in the 45th year of his age, too young for science which has lost an ardent and conscientious laborer, too young for his friends, who mourn the loss of an excellent father, an efficient teacher, and urbane companion.

In his chemical researches, the deceased studied with predilection the constituents of those substances which are or have been employed in medicine. A number of his essays have been transferred to the pages of this Journal; for instance, his analysis of Bryonia alba, Convallaria majalis, Gratiola officinalis, Colocynth, Colchicum, Arnica, &c. He is a bright example of continued devotion to Pharmacy, for the elevation of which he has worked earnestly and successfully as long as he was physically able to do so. J. M. M.

Died, on the 26th of May, 1862, at Morristown, N. J., Dr. LEWIS CONDICT, in the ninetieth year of his age. Dr. Condict is known to many apothecaries as the president of the second Pharmacopœial Convention that met in Washington, Jan. 1830. He was a graduate of the University of Pennsylvania of 1794, with Dr. John Redman Coxe of this city, the oldest living graduate of that school.

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